

**EFFECTIVENESS OF HONEY APPLICATION ON SEVERITY OF
WOUND AMONG PATIENTS WITH DIABETES MELLITUS IN
GOVERNMENT HOSPITAL AT DHARAPURAM.**

**A DISSERTATION SUBMITTED TO
THE TAMILNADU DR. MGR MEDICAL UNIVERSITY, CHENNAI, IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE
DEGREE OF MASTER OF SCIENCE IN NURSING
2010 – 2012**

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DHARAPURAM.**

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ABSTRACT

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. Depending on the etiology of the DM, factors contributing to hyperglycemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production.

Diabetic foot is the more common complication of diabetes mellitus. It is a major health problem and it can cause life style changes and thereby it alters the quality of life of the patients with diabetes mellitus.

Honey is known, since olden days, as an effective wound dressing. Emergence of resistant strains and the financial burden of modern dressing, have revived honey as cost-effective dressing particularly in developing countries. Its suitability for all stages of wound healing suggests its clinical effectiveness in diabetic foot wound infections.

As a complementary therapy, honey dressing is done to the patients to improve the wound healing, anatomical and functional abilities, thereby improving the quality of the life of diabetes mellitus patients.

So the present study was done to evaluate the effectiveness of honey application on severity of wound among patients with diabetes mellitus.

The research design used for this study was quasi experimental non-equivalent pre and post test control group design. Conceptual frame work was based on modified Wiedenbach's - helping art of clinical nursing theory (1969). The sample size was 60, in which 30 were in experimental group and 30 in control group. The samples were selected by using purposive sampling method. The tool used for this study was BWAT (Bates –Jenson wound

assessment tool) scale to assess the severity of wound. In experimental group honey application was done. After cleaning the wound with hydrogen peroxide and normal saline, 10 ml of honey was applied over the wound and applied sterile gauze dressing. Dressing was done daily in the morning for 10 days. Duration of procedure is 15-20 minutes. The post test was done by using BWAT scale on 5th and 10th day for experimental group and on 10th day for control group.

The data gathered were analyzed using descriptive and inferential statistics. The present study revealed that the post test mean score in experimental group was 24.87 (SD \pm 2.46) and in control group the mean score was 33.42 (SD \pm 2.28). The independent 't' value for level of severity of wound was 42.75 which was significant at $P < 0.05$ level.

The study findings revealed that there is no association between the level of severity of wound score among patients with diabetes mellitus and their selected demographic variables except for age ($\chi^2=8.0$), and education($\chi^2=14.04$). The study revealed that honey application was highly effective in reducing the severity of wound among patients with diabetes mellitus.

CHAPTER –I

INTRODUCTION

BACKGROUND OF THE STUDY

Today, increasing emphasis is placed on health, health promotion, wellness and self care. Health is seen as resulting from a lifestyle oriented towards wellness. The result has been the evolution of a wide range of health promotion strategies including multiphase screening, genetic testing, life time health monitoring, environmental and mental health programs, risk reduction and nutrition and health education. A growing interest in self care skills is evidenced by the large number of health related publications designed for lay public. People are increasingly knowledgeable about their health and take more interest and responsibility for their health and well being.

Suddharth.B.,(2008)

Diabetes mellitus is a group of diseases characterized by high levels of glucose in the blood resulting from defects in insulin production (insulin deficiency), insulin action (insulin resistance), or both. Insulin is a hormone produced by the pancreas. When eaten, foods are converted to a type of sugar called glucose that enters the bloodstream, Insulin is needed to move glucose into the body cells where it is used for energy, and excesses are stored in the liver and fat cells.

High levels of glucose in the bloodstream damage the nerves and blood vessels, and can lead to heart disease, stroke, high blood pressure, blindness, kidney disease, amputations, and dental disease.

Raman.,(2005)

Diabetes is a chronic disease that requires daily decisions about food intake, blood glucose testing, medication and exercise. The goals of diabetic management are to reduce symptoms, promote well being , prevent or delay the onset and progression of long term complications, patient teaching, which

enables the patient to become the most active participant in his or her own care is essential for a successful treatment plan.

Lewis.et.al.,(2007)

Diabetes comes from Greek word, and it means a siphon. Aretus the Cappadocian, a Greek physician during the second century A.D., named the condition diabainein. He described patients who were passing too much water (polyuria) - like a siphon. The word became "diabetes" from the English adoption of the Medieval Latin diabetes. In 1675 Thomas Willis added mellitus to the term, although it is commonly referred to simply as diabetes. Mel in Latin means honey; the urine and blood of people with diabetes has excess glucose, and glucose is sweet like honey. Diabetes mellitus could literally mean "siphoning off sweet water". In ancient China people observed that ants would be attracted to some people's urine, because it was sweet. The term "Sweet Urine Disease" was coined.

Raman.,(2005)

World Diabetes Day is the primary global awareness campaign of the diabetes mellitus world and is held on November 14 of each year. For the period of 2009-2013 the theme is Diabetes Education and Prevention and the slogan for 2009 is Understand Diabetes and Take Control. This is represented by a blue circle logo. This blue circle resembles to the global symbol of diabetes and signifies the unity of the global diabetes community in response to the diabetes pandemic.

International federal diabetic Association (2011)

Current theories link the causes of diabetes, singly or in combination, to genetic, autoimmune, viral, and environmental factors (stress). Regardless of its cause, diabetes is primarily a disorder of glucose metabolism related to absent or insufficient insulin supplies and/or poor utilization of the insulin that is available.

Lewis.et.al.,(2007)

Risk factors of type I diabetes mellitus is Genetics and family history, Having family members with diabetes is a major risk factor, Diseases of the pancreas Injury or diseases of the pancreas can inhibit its ability to produce insulin and lead to type 1 diabetes, Infection or illness a range of relatively rare infections and illnesses can damage the pancreas and cause type 1 diabetes.

Risk factors of type II diabetes mellitus is obesity or being overweight. Impaired glucose tolerance or impaired fasting glucose, Insulin resistance, ethnic background. Diabetes occurs more often in Hispanic/Latino Americans, African-Americans, Native Americans, Asian-Americans, Pacific Islanders, and Alaska natives. High blood pressure, History of gestational diabetes, Sedentary lifestyle, Family history, Polycystic ovary syndrome, age.

Iverson.,(2010)

Over a long period of time, hyperglycemia damages the retina of the eye, the kidneys, the nerves, and the blood vessels. Damage to the retina from diabetes (Diabetic retinopathy) is a leading cause of blindness. Damage to the kidneys from diabetes (diabetic nephropathy) is a leading cause of kidney failure. Damage to the nerves from diabetes (diabetic neuropathy) is a leading cause of foot wounds and ulcers, which frequently lead to foot and leg amputations. Damage to the nerves in the autonomic nervous system can lead to paralysis of the stomach (gastroparesis), chronic diarrhea, and an inability to control heart rate and blood pressure during postural changes. Diabetes accelerates atherosclerosis, (the formation of fatty plaques inside the arteries), which can lead to blockages or a clot (thrombus). Such changes can then lead to heart attack, stroke, and decreased circulation in the arms and legs (peripheral vascular disease).

In short time complication of diabetes mellitus is infection, hypoglycemia, diabetic ketoacidosis, Hyper osmolar hyperglycemic non ketotic syndrome

Robert.J.Berry.,(2011)

Diabetic foot ulcers (DFUs), a leading cause of amputations, affect 15% of people with diabetes. A series of multiple mechanisms, including decreased cell and growth factor response, lead to diminished peripheral blood flow and decreased local angiogenesis, all of which can contribute to lack of healing in persons with DFUs.

Mahdoom.et.al, (2009)

Foot disorders are among the most feared complications of diabetes. Ulcer is the most common presentation in diabetic foot disorders as reported over the last two decades. The ultimate endpoint of diabetic foot ulcer is amputation if not well treated. When amputation happens, it is usually associated with significant morbidity and mortality, in addition to immense social, psychological and financial consequences.

Bakhotmah., (2010)

Diabetic complications such as poor circulation and nerve damage can result in loss of sensation and slower wound healing in the lower extremities, which can lead to the formation of diabetic foot ulcers. Diabetics are encouraged to follow a daily foot care regimen that includes washing and inspecting the feet. Ulcers commonly form on the ball of the foot or under the big toe; ulcers on the side of the foot are generally due to improperly fitting shoes.

Juliehumpton.,(2010)

Non-healing foot ulcers and their sequelae are a major source of morbidity and resource use for patients with diabetes mellitus. Peripheral neuropathy, peripheral vascular disease, and poor glycemic control, in conjunction with minor foot trauma, increase the likelihood that patients with diabetes will develop foot ulcers. Because of the neuropathy, a foot injury and subsequent infection cannot be felt and since circulation is also affected, wound healing is compromised and causes the original ulcer to become chronic and may eventually require amputation.

Ramsey.et.al., found that the attributable cost for a 40- to 65-year-old male with a new foot ulcer was \$27,987 USD for the 2 years after diagnosis. Not surprisingly, quality of life is significantly reduced in patients with ulcers and after major amputations.

Dano.R.et.al.,(2011)

Wound healing is the complex and highly regulated process that can be compromised by both endogenous factors (patho physiological) and exogenous factors (micro-organisms). Microbial colonization of both acute and chronic wounds is inevitable, and in most situations endogenous bacteria predominate, many of which are potentially pathogenic in the wound environment.

Mahdoom.et.al.,(2009)

Many studies have proved that Complementary therapy for foot ulcer are effective in treating. Like maggot, leeches, henna, hyperbaric oxygen therapy, polarized light, chelation etc.

Karane.,(2010)

Maggot therapy (also known as maggot debridement therapy (MDT), larval therapy, larva therapy, larvae therapy, bio debridement or bio surgery) is a type of biotherapy involving the introduction of live, disinfected Maggot (fly larvae) into the non-healing skin and soft tissue wounds of a human or animal for the purpose of cleaning out the necrotic tissue within a wound debridement and disinfection.

Joseph.J., (1995)

Leeches possess properties that make them uniquely able to assist with venous compromised tissues. Their saliva contains Hirudin, a direct thrombin inhibitor; Hyaluronidase, which increases the local spread of leech saliva through human tissue at the site of the wound and also has antibiotic properties; A histamine-like vasodilator that promotes local bleeding; and local anesthetic. It helps in healing in diabetic ulcer.

Raman.,(2005)

Many studies have demonstrated that honey has antibacterial activity *in vitro*, and a small number of clinical case studies have shown that application of honey to severely infected cutaneous wound is capable of clearing infection from the wound and improving tissue healing. The physicochemical properties (e.g., osmotic effects and *pH*) of honey also aid in its antibacterial actions.

Mehdi.et.al.,(2009)

Mahdoom.,et.,al,(2009) Reported that honey possesses anti-inflammatory activity and stimulates immune responses within a wound. The overall effect is to reduce infection and to enhance wound healing in burns, ulcers, and other cutaneous wounds. It is also known that honey is derived from particular floral sources that have enhanced antibacterial activity, and these honey is have been approved for marketing as therapeutic honeys.

Honey has been studied extensively and found most effective in wound healing, nearly all types of wounds, may be it is, an abrasion, abscess, amputation, burns, fistula, etc. are found to be responsive to honey therapy. Application of honey as wound dressing leads to rapid healing by stimulation of healing process, clearance of infection, cleansing action of wounds, stimulation of tissue regulation, reduction of inflammation and non adhesive dressing.

Mehdi.et.al.,(2009)

Number of clinical trials and more than 150 medical journal articles have been published, involving thousands of patients using honey as a wound dressing. Findings have shown that honey is effective in quickly clearing existing infection, protects wounds from further infection, minimizes scarring and also reduces wound odors. And also effective in treating a huge range of injuries, including surgical wounds, burns, infectious wounds, ulcers and pressure sores as well as eczema, dry eye, dental wounds and even nappy rash.

Ray. S.,(2010)

Manuka Honey is being used as an ingredient in health care products because of its extraordinary healing properties, especially its ability to miraculously heal wounds. Clinical studies have shown that Manuka Honey effectively addresses wound issues such as exuding wound fluid, tissue inflammation, pain, devitalized tissue and infection. Manuka Honey prevents the bacteria from forming biofilms and proceeds to draw water out of the bacterial cells, making it impossible for the bacteria to survive. This is how Manuka Honey is able to destroy methyl resistant staphylococcus aureus and heal Staphylococcal infections where antibiotics have failed.

Healing properties of Manuka Honey provides a moist healing environment, has a debriding action, eliminates malodor, has extremely powerful antibacterial and antimicrobial properties, has an anti-inflammatory activity which helps in reduction of pain.

Sadagatullah.,(2011)

NEED FOR THE STUDY:

The prevalence of diabetes is rapidly rising all over the globe at an alarming rate. Over the past 30 years, the status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major cause of morbidity and mortality affecting the youth and middle aged people. It is important to note that the rise in prevalence is seen in all six inhabited continents of the globe.

Mohan.V.,(2007)

The World Health Organization (WHO) has projected that the global prevalence of type 2 DM will more than double from 135 million in 1995 to 300 million by the year 2025. Recently, very disturbing estimates have been reported by International Diabetes Federation and WHO, that in the year 2002, at least 177 million people are having DM worldwide, which indicates that previous estimate of 225 million by 2010 is an underestimate. Currently India

has got the largest number of diabetics and is being called as diabetic capital of the world.

Gupta.O.P. et.al.,(2003)

Over 17 million people in the United States, or 6.2% of the population, have diabetes. More than one third of diabetes victims are unaware that they have the disease. Higher rates of diabetes occur in certain populations: 13% of African Americans, 10.2% of Latino Americans, and 15.1% of Native Americans have diabetes. Prevalence of diabetes increases with age. Approximately 151 people less than 20 years of age have diabetes, but nearly 20.1% of the U.S. population age 65 and older has diabetes.

Raman.,(2007)

The overall annual incidence has risen from approximately 16 cases per 100,000 population in the 1990s to 24.3 cases per 100,000 population currently and is probably still increasing. Annual incidence varies from 0.61 cases per 100,000 population in China, to 41.4 cases per 100,000 population in Finland. Even more striking are the differences in incidence between mainland Italy (8.4 cases per 100,000 population) and the Island of Sardinia (36.9 cases per 100,000 population).

Lamb. W.H et.al.,(2010)

The International Diabetes Federation recently published findings revealing that in 2007, the country with the largest numbers of people with diabetes is India (40.9 million), followed by China (39.8 million), the United States (19.2 million), Russia (9.6 million) and Germany (7.4 million).

Jeniffer .H.,(2008)

In Asia, prevalence of diabetes is high and it has been estimated that 20% of the current global diabetic population resides in South-East Asia. Indeed, the number of cases in India is likely to double in two decades that is from 39.9 million (in 2007) to 69.9 million by 2025. The study done by Indian

Council of Medical Research (ICMR) in the year 1970 reported, both in urban and rural prevalence rates of diabetes are increasing rapidly with estimation of 2:1 to 3:1.

Cherian.et.al.,(2010)

Diabetes has emerged as a major healthcare problem in India. According to Diabetes Atlas published by the International Diabetes Federation (IDF), there were an estimated 40 million persons with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025. The countries with the largest number of diabetic people will be India, China and USA by 2030. It is estimated that every fifth person with diabetes will be an Indian. Due to these sheer numbers, the economic burden due to diabetes in India is amongst the highest in the world. The real burden of the disease is however due to its associated complications which lead to increased morbidity and mortality. WHO estimates that mortality from diabetes costs about \$210 billion in India in the year 2005. WHO estimates that diabetes, heart disease and stroke together will cost about \$ 333.6 billion over the next 10 years in India alone. A National Urban Survey in 2000 observed that the prevalence of diabetes in urban India in adults was 12.1 percent

Rajiv. G.,(2010)

Nowhere is the diabetes epidemic more pronounced than in India as the World Health Organization [WHO] reports show that 32 million people had diabetes in the year 2000. The International Diabetes Foundation [IDF] estimates the total number of diabetic subjects to be around 40.9 million in India and further set to rise to 69.9 million by the year 2025 and 80 million by the year 2030. A study done in 1988 in Chennai reported a prevalence of 8.2 % urban and 2.4% in the rural area.

Sandeep. S.,(2007)

In a recent study in Chennai, nearly 25% of the population was unaware of a condition called diabetes. Only 40% of the participants felt that prevalence

of diabetes was increasing and only 22% of the population felt that diabetes could be prevented. The knowledge of risk factors was even lower, only 11.9 % reported obesity and physical inactivity as risk factors. Even amongst the known diabetics, only 40.6 % were aware that diabetes could lead to some organ damage and complications. Many people 46% with diabetes felt that it was a temporary phenomenon.

Rajiv. G.,(2010)

A study was conducted in the field practice area of rural health centers (Chunampett and Annechikuppam, Tamil Nadu), covering a population of 35000 from February to March 2008 find out the prevalence and the risk of diabetes mellitus in general population by using Indian diabetes risk score. 1936 respondents comprising 1167 (60.27%) females and 769 (39.73%) males were studied. Majority 1203 (62.50%) were Hindus. 1220 (63.%) had studied up to higher secondary. 1200 (62%) belonged to lower and lower-middle socio-economic class. A large number of the subjects 948 (50%) were below 35 years of age. Most of the respondents 1411 (73%) indulged in mild to moderate physical activity. 1715 (87.91%) had no family history of diabetes mellitus. 750 (39.64%) individuals were in the overweight category (>25 BMI).

Vedapriya.et.al.,(2010)

In Tirupur district also about 10 per cent of the rural adult population (over 30 years age) in the State was diabetic

Ravichandran., (2010)

The annual incidence of foot ulcers varies from 1.2 to 3.0% and the rate of lower extremity amputation (LEA) has been measured to range between 6% and 23.5%. Major LEAs involve amputations of the leg above or below the knee, whereas minor LEAs involve amputation of the toes or the forefoot. The incidence of major amputation was found to be 0.9% among 8,905 patients with diabetes in the united states.

Daria.o.relliy.,(2011)

Diabetic foot ulcers are estimated to affect 15% of all diabetics during their lifetime and precede almost 85% of all foot amputations in India. In diabetic foot ulcers, 62.29% were seen in non-limb threatening infections and 37.75 were seen in the limb threatening infection. In that 60.87% had to undergo amputation during one-year follow-up.

Amit varma.,(2009)

Diabetes is the leading cause of neuropathy and neuropathy is the most common complication and greatest source of morbidity and mortality in diabetes patients. It is estimated that the prevalence of neuropathy in diabetes patients is approximately 20%. Diabetic neuropathy is implicated in 50-75% of non traumatic amputations in Tamil Nadu.

Ragav.,(2009)

Diabetes mellitus, a metabolic disease, has a population prevalence of about 10-15%. The incidence of foot ulcers ranges from 8 to 17% in Vellore.

Jacob.K.,(2010)

Foot problems are important contributory factors to the high morbidity and mortality observed in diabetic patients, and the economic impact of foot disease is substantial. It has been estimated that up to 50% of all non traumatic lower limb amputations are performed on diabetic patients. In Tamil Nadu diabetic foot disease is exacerbated by socio cultural factors such as the prevalence of walking barefoot, lack of knowledge regarding diabetic foot complications, and the socioeconomic status of patients. Diabetic foot infection constitutes ~10% of diabetes-related amputation.

Snehalatha.,(2009)

Fatma.,(2007), The aim of this study was to determine the prevalence and risk factors for foot complications among diabetic patients. Sample of 513 diabetic patients with a mean age of 53 years (SD: ± 13) were randomly selected. The majority (86%) had type 2 DM. Of the total sample, 39% had peripheral

neuropathy and 12% had peripheral vascular disease. There were no cases of amputation and only one case had previous history of lower extremity ulceration. Significant risk factors for peripheral neuropathy and peripheral vascular disease were: male gender, poor level of education, UAE nationality, increased duration of diabetes, type 2 DM, presence of hypertension and micro albuminuria.

Shukrimi. a.et.al,(2008) did the comparative study between honey and povidone iodine as dressing solution for Wagner type II diabetic foot ulcers. Surgical debridement and appropriate antibiotics were prescribed in all patients. There were 30 patients age between 31 to 65-years-old (mean of 52 years). The mean healing time in the standard dressing group was 15.4 days (range 9-36 days) compared to 14.4 days (range 7-26 days) in the honey group. Ulcer healing was significantly different in both study groups. Honey dressing is a safe alternative dressing for Wagner grade-II diabetic foot ulcers

Dr Shona Blair, a post-doctoral microbiology researcher at the University of Sydney, has been researching the properties of honey for more than six years. Blair found that some types of honey are highly effective in killing many bacteria, including golden staph, (*Staphylococcus aureus*) Honey also leaves infected wounds very clean, because of its ability to break down the "biofilm" found in many wounds. It also has anti-inflammatory properties, reducing pain, particularly in burns and ulcers. It also can reduce scarring. The anti-bacterial properties are particularly high in Manuka honey, from New Zealand

The investigator has observed during her posting in surgical ward the diabetes mellitus patients had stayed in the hospital for a longer period, because of delayed wound healing, and some time underwent amputation. So the diabetic patients were physically and mentally had stress. They were seeking help from others in order to meet their basic need in day today life.

The investigator felt that there is a need to do some intervention to reduce the severity of wound and improve healing and to promote comfort. After reviewing related literatures the investigator came to know that the Manuka honey has good effect in reducing severity of wound and promotes wound healing. So the researcher planned to conduct a study by using Manuka honey in reducing the severity of wound among patients with diabetes mellitus.

STATEMENT OF THE PROBLEM

A study to evaluate the effectiveness of honey application on severity of wound among patients with diabetes mellitus in Government hospital, Dharapuram.

OBJECTIVES

1. To assess the pre and post test level of severity of wound among patients with diabetes mellitus in experimental group.
2. To assess the pre and post test level of severity of wound among patients with diabetes mellitus in control group.
3. To compare the pre and post test level of severity of wound among patients with diabetes mellitus in experimental and control group.
4. To compare the post test level of severity of wound among patients with diabetes mellitus between experimental and control group.
5. To find the association between the post test level of severity of wound among patients with diabetes mellitus and their selected demographic variables in experimental group.

OPERATIONAL DEFINITION

EFFECTIVENESS

Effectiveness refers to the producing an intended result.

Kindersley.D., (2007)

In this study it refers to determine the extent to which the honey application has brought about the significant difference in severity of wound by using statistical measurements and its scores.

HONEY

It is the product of common honey bee for therapeutic purpose, which involves the medicinal use of bee sting.

Mehdi.B.,(2008)

In this study Manuka honey refers to venous has anti inflammatory activity, stimulate immune response within a wound. Application of wound dressing leads to rapid healing by stimulation of healing process, clearance of infection, cleansing action of wound, stimulation of tissue regulation, reduction of inflammation and non adhesive tissue dressing.

HONEY APPLICATION

In this study honey application refers to, after cleaning the wound with hydrogen per oxide and normal saline, 10ml of Manuka honey is applied over the wound followed by a sterile gauze dressing over the wound. It is applied once in a day in the morning for 10 days.

WOUND

It refers to injury to the body that typically involves lacerations or breaking of membrane and usually damage to underlying tissue.

Lewis.et.al.,(2007)

SEVERITY OF WOUND

In this study severity of wound refers to, Patient with diabetic foot ulcer with moderate severity of wound (31 -40). Which is assessed by using Bates –Jenson wound assessment scale by observational method.

DIABETES MELLITUS

It is a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbance of carbohydrate, fat, and protein metabolism resulting from defect in insulin secretion, insulin action or both.

WHO (1999)

PATIENT WITH DIABETES MELLITUS

In this study it refers to patients who are admitted in surgical ward with moderate severity of wound in the foot with diabetes mellitus.

HYPOTHESES

- H₁** : The mean post test level of severity of wound score is significantly lower than the mean pre test level of severity of wound score in experimental group.
- H₂** : The mean post test level of severity of wound score in the experimental group is significantly lower than the mean post test level of severity of wound score in control group.
- H₃** : There will be a significant association between the post test level severity of wound score among patients with diabetes mellitus and their selected demographic variables in experimental group.

ASSUMPTIONS

- Patients with diabetes mellitus may have poor wound healing due to prolonged hyperglycemia.
- Diabetic foot ulcer patients may have self care deficit due to immobility.
- Nurses have an important role in promoting wound healing among patients with diabetic foot ulcer.

DELIMITATIONS

The study was limited to,

- ❖ The sample size for the study was limited to 60.
- ❖ The data collection period was limited to 5 weeks.
- ❖ Samples were delimited to patients with moderate severity of wound.

PROJECTED OUTCOME

Honey application reduces the inflammation, improves healing process, clear the infection. This will help the diabetic patients with foot ulcer in reducing their hospital stay by promoting wound healing and improve their quality of life.

ii) CONCEPTUAL FRAMEWORK

Conceptual framework helps to express abstract ideas in a more reality understandable or precise form of the original conceptualization. The conceptual framework for this study was direction from wiedenbach's helping art of clinical nursing theory (1969).

According to Ernestine wiedenbach's nursing is nurturing and caring for someone in a motherly fashion. Nursing is a helping service that is rendered with compassion, skill and understanding to those in need for care, counsel and confidence in the area of health. The practice of nursing comprises a wide variety of services each directed toward the attainment of one of its three components.

- Step I : Identification of a need for help.
- Step II : Ministering the help needed.
- Step III : Validation that the need for help was met.

Central purpose

According to the theorist the nurse's central purpose defines the quality of health she desires to effect or sustain in her patient and specifies what she recognizes to be her special responsibility in caring for the patient.

In this study the central purpose is to reduce the level of severity of wound among patients with diabetes mellitus.

STEP I- IDENTIFICATION OF A NEED FOR HELP

According to the theorist within the identification component there are four distinct steps. First, the nurse observes the patient, looking for an inconsistency between the expected behavior of the patient and the apparent behavior. Second, attempts to clarify what the inconsistency means. Third, determines the cause of the inconsistency. Finally, validates with the patient that her help is needed.

In this study the patient with moderate severity of wound among diabetes mellitus are selected for experimental group and control group. The general information which comprises assessment of demographic variables for both experimental and control group such as age, sex, education, occupation, marital status, family monthly income, area of residence, duration of illness and duration of treatment were assessed and pre test level of severity of wound among patients with diabetes mellitus was observed by using Bates-Jenson assessment tool(BWAT) scale in both the groups.

STEP II: MINISTERING THE HELP NEEDED

According to the theorist in ministering to the patient the nurse may give advice or information, make a referral, apply a comfort measures or carry out a therapeutic procedures. The nurse will need to identify the cause and if necessary make an adjustment in the plan of action.

Ministering of help needed it has two component.

- ❖ Prescription
- ❖ Realities

Prescription

According to the theorist a prescription is directive to activity. It specifies both the nature of the action that will most likely lead to fulfillment of the nurse's central purpose and the thinking process that determines it.

In this study Prescription is the plan of care to achieve the purpose which include administration of honey application. First the wound is cleaned with hydrogen per oxide and normal saline, then 10ml of Manuka honey is applied over the wound followed by a sterile gauze dressing over the wound. This procedure is done once a day in morning for 10 days.

Realities

According to the theorist the realities of the situation in which the nurse is to provide nursing care. Realities consist of all factors -physical, physiological, emotional and spiritual that are at play in a situation in which nursing actions occur at any given moment. Wiedenbach's defines the five realities as the agent, the recipient, the goal, the means and the framework.

- **Agent**

According to the theorist, the agent is the practicing nurse or her delegate is characterized by personal attribute capacities, capabilities and most importantly commitment and competence in nursing.

In this study the investigator is the agent.

- **Recipient**

According to the theorist the recipient is the patient, is characterized by the personal attributes, problem, capabilities, aspirations and most important the ability to cope with the concerns or problems being experienced.

In this study the recipients are diabetic patients with moderate severity of wound in the foot.

- **Goal**

According to the theorist the goal is the desired outcome the nurse wishes to achieve. The goal is the end result to be attained by nursing action.

In this study it refers to reduce the level of severity of wound among patients with diabetes mellitus.

- **Means**

According to the theorist the means comprise the activities and devices through which the practitioner is enabled to attain her goal. The means include skills, techniques, procedures and devices that may be used to facilitate nursing practice.

In this study it refers to honey application for experimental group once in a day in the morning for 10 days among patients with diabetes mellitus.

- **Framework**

According to the theorist the framework is consists of the human environmental, professional and organizational facilities that not only make up the context within which nursing is practiced but also constitute is currently existing limits .

In this study it refers to male and female surgical ward in Government hospital, Dharapuram.

STEP III: VALIDATION THAT THE NEED FOR HELP WAS MET

According to the theorist the third component is validation. After help has been ministered the nurse validates that the actions were indeed helpful. Evidence must come from the patient that the purpose of the nursing actions has been fulfilled.

In this study, validating the need for help was met by means of post assessment for both experimental and control group using BWAT scale. For experimental group severity of wound was assessed on 5th and 10th day. In control group severity of wound was assessed on 10th day.

CENTRAL PURPOSE
TO REDUCE THE LEVEL OF SEVERITY OF WOUND AMONG PATIENTS WITH DIABETES MELLITUS

STEP – I
Identification of needed help

DEMOGRAPHIC VARIABLES

Age, Sex, Education, Occupation, marital status, Family monthly income, Area of residence, Duration of illness, Duration of treatment.

PRE TEST

Assessment of level of severity of wound among patients with diabetes mellitus in experimental and control group by using BWAT (Bates-Jenson wound assessment tool) scale.

STEP – II
Ministering the Needed help

PRESCRIPTION (Honey application)

Wound is cleaned with hydrogen peroxide and normal saline, then 10ml of Manuka honey is applied over the wound followed by a sterile gauze dressing over the wound. This procedure was done once in a day in the morning for 10 days in experimental group.

REALITIES

Agent : Investigator
Recipient : Diabetic patients with moderate severity of wound in the foot.
Goal : Reduce the level of severity of wound among patients with diabetes mellitus.
Mean : Administration of honey application and dressing for experimental group once in a day in the morning for 10 days.
Framework : male and female surgical ward at Government hospital, Dharapuram.

STEP – III
Validating of the Need for help was met

Post test was done by using BWAT (Bates-Jenson wound assessment tool) to assess the level of severity of wound in both experimental and control group.

Experimental group. Post test on 5th and 10th day

Control group. Post test on 10th day

Minimal severity of wound

Mild severity of wound

Moderate severity of wound

Critical severity of wound

FEED BACK

CONCEPTUAL FRAMEWORK
FIG: 1 MODIFIED WIEDEN BACH'S HELPING ART OF CLINICAL NURSING THEORY (1964)

CHAPTER-II

REVIEW OF LITERATURE

The literature review involves the systemic identification, location, scrutiny and summary of written materials that contains information of research problems (polit and hungler (2004)).

The literature gathered from through review is deplicated under the following headings.

PART –I

Over view of

- a) Diabetes mellitus.
- b) Pharmacological and non – pharmacological management for diabetic wound

PART-II

- Section A : Studies related to incidence and prevalence of diabetes mellitus and severity of wound.
- Section B : Studies related to complementary and alternative therapy on severity of wound among patients with diabetes mellitus.
- Section C : Studies related to honey application on severity of wound among patients with diabetes mellitus.
- Section D : Studies related to nurses role in honey application among patients with diabetic foot ulcer.

PART –I

OVERVIEW

a) DIABETES MELLITUS

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defect in insulin secretion, insulin action or both. The basis of the abnormalities in carbohydrate, protein and fat metabolism in diabetes is the deficient action of insulin on the target tissue of skeletal muscle, adipose tissue and liver. Uncontrollable Diabetes mellitus may result in long term damage, dysfunction and failure of various organs, especially in heart, kidneys and eyes. Diabetes mellitus is a serious health problem throughout the world and its prevalence is increased rapidly. The long term complications of diabetes make it a devastating disease

Basavanthappa.,(2003)

DEFINITION

Diabetes mellitus is a group of metabolic diseases characterized by elevated levels of glucose in the blood (hyperglycemia) resulting from defects in insulin secretion insulin action or both.

Suddharth.B.,(2004)

HISTORY

Sushruta (5 century) described a condition ‘‘Madhumeha’’ in which a person passes urine which resembles honey. The Egyptian Papyrus (1500 BC) described the illness. Aretaeus of Cappadocia (2 nd century AD) gave the name diabetes. Willis in 1674 named it as ‘‘diabetes mellitus ‘‘Nobel prizes awarded for work in subject related to insulin and diabetes mellitus.

Raman P.G. (2009)

INCIDENCE

Diabetes mellitus affects about 17 million people, 5.9 million of who are undiagnosed. In the United states, approximately 8,00,000 new cases of

diabetes are diagnosed yearly . Diabetes is prevalent in the elderly with up to 50% of people older than 65% suffering some degree of glucose intolerance In United states diabetes is the leading cause of non traumatic amputations blindness among working age adults and end stage renal disease. Diabetes is the third leading cause of death by disease

Suddharth.B.,(2004)

RISK FACTORS

The risk factors of diabetes mellitus are family history of diabetes, obesity (> 20% over body weight), race ethnicity (eg: African Americans), age > 45 years, previously identified impaired fasting glucose, hypertension, HDL cholesterol level < 35 mg / dl, history of gestational diabetes.

CLASSIFICATION

- A. Insulin Dependent Diabetes Mellitus (IDDM, Type I)
- B. Non Insulin Dependent Diabetes Mellitus(NIDDM, Type II)
- C. Impaired Glucose Tolerance (IGT)
- D. Gestational diabetes mellitus
- E. Diabetes associated with other conditions:
 - Like drugs , chemicals, hormones, genetic syndromes
 - Corticosteroids
 - Cushings diseases
 - Like diseases of pancreas
 - Pancreatitis
 - Cancer of the pancreas

Lippincott.,(1996)

PATHOPHYSIOLOGY

Normally, insulin produced by the beta cells of the islets of Langerhans in pancreas is needed to ‘open the door’ to the cell, allowing the glucose to enter.

- (i) In type 1 Diabetes Mellitus, the pancreas does not produce insulin which leads to the inability of glucose to enter the cells resulting increased glucose in blood stream.
- (ii) In type II Diabetes Mellitus, decreased insulin production allow less amount of glucose enters the cell resulting in Hyperglycemia.

Willson.L.S.,(1990)

SIGNS AND SYMPTOMS

Classic symptoms of diabetes mellitus include the three P's –Polydipsia, polyuria, and polyphagia. Others include weight loss, nocturia, dehydration, fatigue, blurred vision, abdominal pain, headache.

LABORATORY STUDIES

- History and physical examination.
- Blood tests
 - ❖ Fasting blood sugar(≥ 126 mg/dl)
 - ❖ Postprandial blood glucose(≥ 200 mg/dl)
 - ❖ Fasting plasma glucose (≥ 126 mg/dl)
 - ❖ Blood urea and nitrogen (10 -30 mg/dl)
 - ❖ Serum creatinine(0.2 -1.0 mg/dl)
 - ❖ Electrolytes
 - ❖ TSH((0.3 – 5.4 μ U/ml)
- Urine test
 - Complete urinalysis
 - Micro albuminuria
 - Acetone
- Funduscopy examination – dilated eye examination
- Neurological examination, including monofilament test for sensation to lower extremities.

- ECG
- Blood pressure
- Monitoring for weight
- Doppler scan
- Dental examination
- Foot examination

I – NEUROPATHY EVALUATION

a)	Sensory	Pinprick sensation Vibration and position sense Thermal discrimination test
b)	Motor	Bio thesiometry Wasting, weakness Absent tendon reflexes
c)	Autonomic	Electro physiological test Reduced sweating Skin texture, callus Quantitative sweat test Doppler studies

II- VASCULAR EVALUATION

a) History of claudication or rest pain.

b) Systolic ankle

Brachial index; it is calculated as the ratio of the average systolic blood pressure in both the lower limbs in anterior and posterior tibial arteries and higher of the systolic pressure in both brachial arteries.

c) Digital /arm systolic pressure ratio

The digital systolic pressure is calculated using a small cuff plethysmograph. A ratio of 0.5 is highly indicative of ischemia it is more reliable than the above.

d) Transcutaneous PO₂(TcPO₂)

On the dorsum of the foot, site of trophic lesion or intended lies sensitivity of the test can be increased by increased by taking the measurement with the patient standing or by giving the patient 100% for 10min. before measuring an increase of 10mm hg indicates a better prognosis.

e) Doppler ultrasonography

For evaluation of status of the large arteries

f) Radiography

For osteoarticular disease and arterial calcification

COMPLICATIONS

Acute complications like diabetic ketoacidosis, hyperglycemia and hypoglycaemia. Macrovascular complications include cerebrovascular, cardiovascular and peripheral vascular disease. Microvascular complications include diabetic retinopathy, peripheral neuropathy, peripheral nephropathy and complications of the foot and lower extremity.

Rubin.R., (2000)

DIABETIC FOOT

INTRODUCTION

The morbidity (one in every five diabetics admitted to hospital are due to foot lesions) and economic burden imposed by this largely preventable condition requires that more attention be paid to this relatively neglected complication of diabetes mellitus.

INCIDENCE OF FOOT ULCER IN DIABETES

- Neuroischaemic – 58%
- Ischaemic – 9%
- Others – 3%
- Multifactorial – 5%

ETIOLOGY OF FOOT LESIONS

The foot lesions in diabetes mellitus are traditionally thought to be a result of combination of neuropathy, peripheral vascular disease and infection. The relative contribution of each of the above factors is not known, but it is thought that in young type-I diabetics, neurological component predominates, while in other patients neurological and vascular factors contribute equally. Infection plays an important part in both the groups.

I –INFECTION

Diabetics are more prone to infection because of their impaired glucose tolerance and leucocyte and cell immunity. Infection spread rapidly in the feet aided by neuropathy and peripheral vascular disease. The infecting organisms include both aerobes and anaerobes and also sometimes fungus.

Infection not only cause destruction of tissue but also increase the demand of blood supply, which cannot be met because of vascular disease and thus further aggravates the situation by producing relative ischemia and predisposes to gangrene. Neurogenic athropathy, spontaneous dislocations may also be contributory factors.

CLINICAL MANIFESTATIONS

Diabetes				
Neuropathy		Abnormal blood flow		
Somatic Pain And proprioception Muscle imbalance	Autonomic flow regulation Sweating Fissuring	Altered Shunting	Macrovascular disease Microvascular disease, reduced capillary blood flow	
Abnormal stresses				
Deliver response to infection				

CLINICAL CLASSIFICATION OF DIABETIC FOOT LESIONS

(WAGNER'S)

- Grade 0 : At risk foot
- Grade 1 : Superficial ulcer, not clinically infected.
- Grade 2 : Deeper ulcer, often infected but no bone involvement
- Grade 3 : Deeper ulcer, abscess formation, bony involvement.
- Grade 4 : localized gangrene.
- Grade 5 : Gangrene of whole foot.

Risk factors for diabetic lesions

- ❖ History of ulceration, performing plantar ulcer on amputation
- ❖ Intermittent claudication
- ❖ Deformity – callus – claw toes – flat foot
- ❖ Loss of temperature, discrimination, pain and vibration (at least two)
- ❖ Evidence of hemodynamically significant peripheral vascular disease on investigation.

SCHEMES FOR EVALUATION OF PATIENTS

DIABETES NOT AT RISK SHOULD

- ❖ Take care of foot regularly
- ❖ File the nail, not cut.
- ❖ Stop smoking
- ❖ Wear comfortable, well fitting shoes
- ❖ Take regular exercise
- ❖ Seek help immediately for any problem

DIABETES AT RISK SHOULD

- Inspect foot daily
- Report any lesion or any suspected change of colour
- Never walk bare foot; -wash foot daily warm water and soap, do not soak foot for long time and dry thoroughly especially between toes.
- Apply moisturizing cream and abrade areas of keratoes (using pumice stone or emery board); keep nails fairly long, file them and not cut.
- Not perform bathroom surgery for corns and blisters
- Change socks daily
- Carefully choose shoes. They must be supple, not too wide and not too narrow, check for foreign objects bearing them, not wear high heels.
- Not expose foot to extremes of temperature.

TREATMENT MODALITIES

Treatment modalities are Nutritional therapy, Exercise therapy, Drug therapy-Insulin, Oral and other agents, Enteric coated aspirin, ACE inhibitors, Anti hyper lipidemic drugs ,Self monitoring of blood glucose (SMBG), Pancreas transplantation, Patient and family teaching and follow up programs

Lewis.et.al.,(2007)

NUTRITIONAL THERAPY

Total calories intake must be reduced for type II diabetes mellitus. Low carbohydrate diet is recommended. It should provide 45% to 65% of total calorie intake each day. Diet with decreased fat and cholesterol is advised. Total fat intake is not more than 25% to 30%. Protein should contribute less than 10% of the total energy consumed in those with diabetes mellitus. Alcohol should be avoided and nutritive or non nutritive sweeteners may be included.

EXERCISE THERAPY

Regular, consistent exercise is considered as an essential part of diabetes and pre diabetes management. Exercises increases the insulin receptor sites in the tissues and lowers the blood glucose levels. It also contributes weight loss. Any new exercise program in the diabetic patient should be started only after medical clearance and should be started slowly.

DRUG THERAPY

Exogenous (injected) insulin is needed when a patient has inadequate insulin to meet specific metabolic needs. People with type I diabetes mellitus require exogenous insulin to survive. People with type II diabetes mellitus may require it temporarily .There are rapid acting insulin, short acting insulin, intermediate acting and long acting insulin.

Oral agents include sulfonylureas, meglitinides, biguanides, glucosidase inhibitors, thiazolidinediones, dipeptidyl peptidase-4 inhibitors, Amylin analogs, incretin mimetic.

SELF MONITORING OF BLOOD GLUCOSE (SMBG)

SMBG is a cornerstone of diabetes management. By providing current blood glucose reading SMBG enables patient to make self management decisions regarding diet, exercise, and medication.

PANCREAS TRANSPLANTATION

It can be used as a treatment option for patients with diabetes mellitus. Most commonly, it is done for patients who have end stage renal disease or plan to have a kidney transplant.

MANAGEMENT FOR FOOT ULCER

- Broad spectrum antibiotics.
- Local debridement of necrotic areas.
- Incise and drain the pus
- Frequent dressing carefully done
- Revascularization procedures if significant ischaemia is present
- Amputation if the above measures fail and gangrene develops.

Diabetics need special foot wear like moulded insole, extra depth shoes, rocket sole, custom made foot wear.

COMPLEMENTARY THERAPIES OF DIABETES MELLITUS

Maggot therapy

Maggot therapy (also known as maggot debridement therapy (MDT), larval therapy, larva therapy, larvae therapy, bio debridement or biosurgery) is a type of biotherapy involving the introduction of live, disinfected maggot (fly larvae) into the non-healing skin and soft tissue wounds of a human or animal for the purpose of cleaning out the necrotic tissue within a wound debridement and disinfection.

Joseph.J.,(1995)

Leeches

Leeches possess properties that make them uniquely able to assist with venous compromised tissues. Their saliva contains Hirudin, a direct thrombin inhibitor; Hyaluronidase, which increases the local spread of leech saliva through human tissue at the site of the wound and also has antibiotic properties;

A histamine-like vasodilator that promotes local bleeding; and local anesthetic. It helps in healing in diabetic ulcer.

Karen.M.,(2009)

Hyperbaric oxygen therapy

The primary mechanism of action of hyperbaric oxygen—enhancement of tissue oxygenation—makes this therapy particularly useful for the resolution of hypoxic conditions such as traumatic crush injuries, necrotizing fasciitis, gas gangrene, carbon monoxide poisoning, and anemia due to extensive blood loss. In hyperbaric oxygen therapy, patients breathing 100% oxygen are placed in a chamber pressurized to 2 to 3 times of atmospheric pressure. This pressure is equivalent to diving to approximately 15 m (50 ft) in seawater.

Chatherin.,(2002)

Low-level laser therapy

Low-level laser therapy (LLLT; also known as bio stimulation and photo bio stimulation) is a form of phototherapy that involves the application of low-power monochromatic and coherent light to injuries and lesions in order to stimulate wound healing. It has been shown to increase the speed, quality and tensile strength of tissue repair, resolve inflammation and provide pain relief.

Heidi.,(2005)

Aloevera

Aloevera, again in-vitro, has been shown to stimulate the replication of skin fibroblasts, with an effect almost three times as great as healing in a control (danhoff and mcanally 1983). This means that aloe Vera could be an important way of enhancing wound healing. It is considered safe for both topical and oral use and where people react adversely; it tends to be towards a product additive, such as an anti-oxidant or stabilizer, rather than the aloe itself.

Rungpitarangsi V.et.al.,(2006)

HONEY APPLICATION

INTRODUCTION

Honey is one of nature's wonder. It is nectar gathered from the blossoms of many flowers by bees. It is then taken in to the beehive and changed by the worker bees. Worker bees remove the liquid from the nectar. The finished product is heavy syrup with 12 to 20 percent moisture and 80 to 85 percent sugar. It is a good source of quick energy for the human body.

DEFINITION

The definition of honey stipulates a pure product that does not allow for the addition of any other substance. This includes water or other sweeteners.

THE CONTENTS OF MANUKA HONEY

- Sugar like fructose, glucose, sucrose, maltose, lactose and other disaccharides and tri saccharides.
- Proteins, fats, vitamins, minerals, enzymes and amino acids
- Volatile aromatic substances.
- Ashes and water etc.

Manuka honey preparation

Manuka also known as New Zealand Tea Tree or *Leptospermum Scoparium* is a small tree that grows native to New Zealand particularly on the east coast of the North and South Islands. The Manuka tree is an evergreen growing up to 15 meters in height. Its leaves are small and prickly and its flowers bear white to pink colour flowers. Honey bees collect nectar from the Manuka flowers. It is then produced into a dark, rich, distinctive flavoured honey known as Manuka honey. An agar-well diffusion assay is conducted on the bacterium *Staphylococcus aureus* to test the methyl glyoxal's antibacterial activities. Firstly, two wells are created in an agar plate, and *S. aureus* cells are scraped onto each well using an inoculating needle. After soaking small squares of blotter paper with methyl glyoxal and phenol solution separately into the wells, each square is set in different ends of the agar plate using

forceps and then left upside down in the refrigerator for a few days. After that, a comparison between the size and shape of the bacterial colonies is made to determine the antibacterial activities between the two. Varying concentrations of phenol solution are used to find one that coincides with the antibacterial potency of the methyl glyoxal. This can allow fair comparison and determine its accuracy.

Properties of Manuka honey

- Honey's antibacterial quality not only rapidly clears existing infection, it protects wounds from additional infection
- Honey debrides wounds and removes malodor
- Honey's anti-inflammatory activity reduces edema and minimizes scarring
- Honey stimulates growth of granulation and epithelial tissues to speed healing.

Other uses of Manuka honey

Use Manuka Honey Internally For

- Acid Reflux
- Diarrhea
- Gastritis
- Heartburn
- Peptic Ulcer
- Up-set Stomach
- Ulcerative Colitis
- Duodenal Ulcers
- Esophagus Ulcers
- Digestive Problems
- Helps Irritable Bowel Syndrome
- Protects Gastrointestinal System

Use Manuka Honey Externally For

- Acne
- Skin Ulcer
- Athletes Foot
- Dental Health
- Open Wounds
- Eye Infections
- Diabetic Wound
- Arthritic Inflammation
- Insect bites and stings
- Cracked Skin Conditions
- Minor Cuts, Scratches, abrasions
- Foot/Leg Ulcer (including Diabetic)
- Amputation Stump Wound (Diabetic)
- Burns (First, Second, and Third Degree)
- Foot and leg sores (including Diabetic & open leg sores)

MECHANISM OF ACTION

There are several mechanisms through which honey is thought to act on and heal wounds. When it is applied directly on a wound surface or via a dressing, it can act as a sealant, keeping the wound moist and free from contamination. In addition, honey is comprised of glucose (35%), fructose (40%), sucrose (5%), and water (20%). This high sugar content plus vitamins, minerals, and amino acids) provides topical nutrition that is thought to promote healing and tissue growth. Honey is also a hyperosmotic agent that draws fluid from the wound bed and underlying circulation, which kills bacteria that cannot thrive in such an environment. It is bactericidal in other ways as well. During the process of honey production, worker bees add the enzyme glucose oxidase to the nectar. When honey is applied to the wound, this enzyme comes into contact with oxygen in the air, which leads to the production of the bactericide hydrogen peroxide. Macroscopically, honey has also shown debriding action.

BENEFITS OF HONEY

- The most common use of honey as a microbial agent is as a dressing for wounds, burns and skin ulcers. This application has a long history in traditional medicine, additionally the use of honey reduces odors, reduces swelling, and reduces scarring, it also prevents the dressing from sticking to the healing wound.
- The honey has antibacterial properties has been established for over a century, but in many cultures it has been used as a medicine. It is now less established that honey inhibits a broad spectrum of bacterial and fungal species.
- Honey has powerful antimicrobial properties, which can soothe your raw tissue. Pour a teaspoon of honey into a large serving spoon and then top off the spoon with lemon juice. Swallow the concoction (without water) every few hours until symptoms clear up. Some people add a pinch of black or red pepper to increase blood circulation to the throat
- Honey is useful for the skin diseases. It can be applied externally for wounds, sores and burns. It is also believed to minimizing disfiguring scar.
- Honey is useful in providing energy to the body.
- As it contains sugars which are quickly absorbed by the digestive system and converted in to energy. This can be used as instant energizer.
- As it is hygroscopic, it speeds up healing tissue and dries it up.
- Honey act as a sedative and it very useful in bed wetting disorders.
- Honey is very good antioxidant which restores the damaged skin and gives soft, young looks.
- Honey has antibacterial properties due to its acidic nature and enzymatically produced hydrogen peroxide.
- Constant use of honey strengthens the white blood corpuscles to fight against bacterial and viral diseases.

PART -II

Section A: Studies related to incidence and prevalence of diabetes mellitus and severity of wound

Javid.A.et.al.,(2011), the aim of study was to assess the prevalence and risk factors for diabetes mellitus in the age group of 20 years and above in one of the semi-urban areas. The prevalence of diabetes mellitus was 6.05%, with known diabetes mellitus being 4.03% of the study population and undiagnosed diabetes mellitus being 2.02% subjects. Significant difference was detected between males and females (3.6%vs 8.3%, $p < 0.05$). There was also significant increase in the prevalence of diabetes mellitus with increasing age (age 20-40 years: 3.02% vs > 60 years 16.66%, $P < 0.05$). Furthermore prevalence of obesity (body mass index > 25 Kg/m²) was 36.82 % more so central obesity, & family history were significantly associated with the presence of diabetes mellitus,($p < 0.001$).

Allien.K.et.al.,(2011),The aim of the study was to assess the prevalence, awareness and treatment levels of Type 2 diabetes in a Swiss city. Total prevalence of Type 2 diabetes was 6.3% higher in men (9.1%) than in women (3.8%, $P < 0.001$) and increased with age. Two-thirds of participants with Type 2 diabetes were aware of their status and among those aware 86.0% were treated. Treatment was more frequent in men (91.3%) than in women (75.9%, $P < 0.001$). Two-thirds of those treated for Type 2 diabetes were on monotherapy. and represented 48% of all antidiabetic drugs. Prevalence of Type 2 diabetes in Switzerland is estimated to be between 5.7% and 7.0%.

Sanjay.K.et.al.,(2010), the study aim is prevalence of type 1 diabetes in north India. The overall prevalence of type 1 diabetes in Karnal district is 10.20/100,000 population, with a higher prevalence in urban (26.6/100,000) as compared to rural areas (4.27/100,000). Karnal city, with a population of 222017, has a relatively high prevalence of type 1 diabetes (31.9/100,000). The prevalence in men is higher (11.56/100,000) than in women (8.6/100,000). In the 5 to 16 years age group, the prevalence is 22.22/100,000, while in the 0-5

years age group, prevalence is 3.82/100,000. This report highlights the urban-rural and male-female gradient in the prevalence of type 1 diabetes in Karnal, north India.

Carolene.et.al.,(2009), he did the Community based prevalence for diabetes related foot disease (DRFD The Questionnaire for Diabetes Related Foot Disease (Q-DFD) comprised 12 questions aimed at determining presence of peripheral sensory neuropathy (PN) and peripheral vascular disease (PVD), based on self report of symptoms and/or clinical history, and self report of foot ulceration, amputation and foot deformity. Survey results for 38 from 46 participants demonstrated agreement with either clinical assessment or medical record (kappa 0.65, sensitivity 89.0%, and specificity 77.8%). Correlation for individual survey components was moderate to excellent. Inter and intrarater reliability and test re-test reliability was moderate to high for all survey domains.

Fatimah.et.al.,(2007),The study was part of a general cross-sectional survey carried out to assess the prevalence of DM complications in Al-Ain district, UAE. Forty nine percent of the study populations were diagnosed to have DM without presenting with symptoms of diabetes and 35% had hypertension. The majority (86%) had type 2 DM. Of the total sample, 39% had PN and 12% had PVD. There were no cases of amputation and only one case had previous history of lower extremity ulceration. Significant risk factors for PN and PVD were: male gender, poor level of education, UAE nationality, increased duration of diabetes, type 2 DM, presence of hypertension and micro albuminuria (MA).

Nidip,(2007), The authors sought to determine the prevalence and risk factors of the diabetic foot in a clinic population. Foot lesions were classified according to Wagner grades. The prevalence of foot lesions was 13.0% (inpatients 25.6% and outpatients 11.1%). Diabetic neuropathy assessed using monofilaments was found in 81 patients (27.3%). The prevalence of ischemia

was 21.3% and deformity was 17.3%, whereas 37 patients (12.3%) had a previous history of foot lesions. Foot examination was done in 14.3% of patients, and 47% had a risky nail-trimming habit, whereas 22% wore ill-fitting shoes. The prevalence of diabetic foot lesions is high, and known risk factors are significantly present, especially poor foot care.

Papelbaum.M.et.al., (2010) Brazil, states that the purpose of our study was to assess quality of life in a clinical sample of patients with type 2 diabetes mellitus and its association with depressive symptoms and glycemic control. 100 outpatients from a sequential sample underwent clinical and psychiatric evaluation. The problem areas of diabetes scale (PAID) and the Beck Depression Inventory (BDI) were used to assess the quality of life. The levels of glycated haemoglobin (HbA1C) were used as the main parameter of glycemic control. The perception degree of the quality of related with diabetes was associated with the severity of depressive symptom ($r = 0.503$, $p < 0.001$).

Smith.et.al.,(2010), the aim of the study the effects of diabetes characteristics, foot deformity, behavioral factors, and neurovascular function on foot ulcer risk among 749 diabetic veterans with 1,483 lower limbs. Using stepwise Cox regression analysis, the following factors were independently related to foot ulcer risk: foot insensitivity to the 5.07 monofilament, past history of amputation 2.8 or foot ulcer, insulin use 1.6, Charcot deformity 3.5, 15 mmHg higher dorsal foot transcutaneous PO₂ 0.8, 20 kg higher body weight 1.2, 0.3 higher ankle-arm index 0.8, poor vision, and 13 mmHg orthostatic blood pressure fall 1.2. Higher ulcer risk was associated with hammer/claw toe deformity and history of laser photocoagulation in certain subgroups. Certain foot deformities, reduced skin oxygenation and foot perfusion, poor vision, greater body mass, and both sensory and autonomic neuropathy independently influence foot ulcer risk, thereby providing support for a multi factorial etiology for diabetic foot ulceration.

Alvarez.F.et.al.,(2010)USA, conducted a study to evaluate the association between patient reported hypoglycemic symptoms with Type 2 Diabetes Mellitus from 7 European countries . Questionnaires measured patient reported hypo glycaemic symptoms, health related quality of life (EuroQ 01 visual analogue scale, EQ -5D Vas) and treatment related adverse events. A total of 1,709 patients were included in the study. Mean patient age was 63 years , 45% were female, mean HbA 1C was 7.06 %. Adjusted linear regression analysis revealed that patients reporting hypo glycaemic symptoms had worse patients reported quality of life (mean difference -4.33, $p<0.001$). The adjusted decrement to quality of life increased with greater hypo glycaemic symptom severity (mild : 2.68 , $p= 0.0039$, moderate : -6.42 , $p<0.001$, severe : -16.09, $p< 0.001$).

Kolawole.B.et.al.,(2009)Nigeria presented data comparing the quality of life effects of type 2 diabetes determined by the Bradley well being questionnaire and the WHO QOL –BREF , a generic instrument . The internal consistency of the quality of life scales was assessed using cronbach’s alpha. The patients had a mean age of 55.8+ / -13 years 41.5 % were females and all patients are diabetics for 7.9+/-7.1 years .13 (24.5%) were being tested with oral agents 14 (26.4%) were are insulin and 26 (49.1 %) were on combined therapy. The cronbach alpha co efficient ranged from 0.31 to 0.72 on the wellbeing sub scale and from 0.47 to 0.78 on the WHO QOL – BREF subscales.

Analava.et.al.,(2008), The present study is done to see the effects of different doses of fenugreek in type 2 diabetes with dyslipidaemia. 80 patients were chosen from random rural population suffering from mild type 2 diabetes with dyslipidaemia. Fenugreek seed powder was given in the diet in doses of 25 g, 50 g, 75 g and 100 g/day, consumed by the patients in powdered form mixed with water as a drink. Addition of *Tulsi* (also a mild hypoglycaemic agent) masks the bitter taste of Fenugreek and acts as an anti-diarrhoeal. It was observed that reduction in blood sugar maintained a direct relationship with

doses of fenugreek given up to 75 g/day. No significant effects in reduction of blood sugar were observed with further increasing the doses of fenugreek.

Maluf,(2003), The aim of this study to compare the amount of weight-bearing activity and estimates of cumulative plantar tissue stress between subjects with and without diabetes mellitus and a history of recurrent plantar ulcers. Subjects with diabetes and a history of recurrent plantar ulcers were 46% less active than subjects without diabetes (mean (SD)=2727 (1345) versus 5037 (2624) strides/day, $P=0.04$), and accumulated 41% less daily stress on the forefoot than non-diabetic and diabetic control subjects without a history of plantar ulcers (mean (SD)= 210 (134) versus 354 (118) and 354 (148) MPas/day respectively, $P=0.03$). Subjects with diabetes and a history a previous ulcers may be susceptible to plantar tissue injury even at relatively low levels of cumulative tissue stress.

Fedrick.et.al.,(2000), Acute psychological stress is believed to cause disturbances of metabolic control in patients with Type I diabetes. Subjects in the three groups were matched for age, weight, sex, and socioeconomic status. For all subjects, the mean increase in heart rate was 20 beats per minute while they were doing mental arithmetic and 25 beats per minute while they were speaking publicly ($P<0.001$). In all three groups, systolic and diastolic pressure rose markedly, the plasma epinephrine level increased by 50 to 150 pg per milliliter, and the nor epinephrine level by 100 to 200 pg per milliliter under both stress conditions ($P<0.001$). The plasma cortisol level rose significantly after public speaking in all groups. Neither stress induced changes in circulating levels of glucose, ketones, free fatty acids, glucagon, or growth hormone.

SECTION B: Studies related to complementary therapy on severity of wound among patient with diabetes mellitus:

Chin.J.et.al.,(2010), The aim of this study was compared effectiveness of extracorporeal shock wave therapy (ESWT) and hyperbaric oxygen therapy

(HBOT) in chronic diabetic foot ulcers. The over all clinical results showed completely healed ulcers in 57% and 25% ($P = 0.003$); 50% improved ulcers in 32% and 15% ($P=0.071$); unchanged ulcers in 11% and 60% ($P < 0.001$) and none worsened for the ESWT and the HBOT group respectively. The blood flow perfusion rates were comparable between the two groups before treatment ($P=0.245$), however, significant differences were noted after treatment favoring the ESWT group ($P=0.002$). ESWT is more effective than HBOT in chronic diabetic foot ulcers.

Anurag.et.al.,(2008), did the study the effectiveness of Neem+ oil on chronic and infected wounds, mainly diabetic ulcers and bed sores. A randomized control study has been designed First of all the wound was cleaned under running tap water for at least 10 minutes followed by calcium alginate dressing impregnated in Neem+ oil which was covered by an absorbent pad and secured with a tape or bandage. . It requires dressing changes every 2nd, 3rd and at times upto 5 days, Assessment Criteria Complete healing at the end of 6th week coded as healed/not healed, study results was 45 / 50 patients were completely healed in the case arm whereas 1 / 50 patient completely healed in control arm. In the case arm 27 / 28 diabetic patients were healed compared to none out of 29 patients in control arm. Neem+ oil would offer a cheaper remedy which is so very critical for a developing nation like India.

Daria.R.et.al.,(2011), did the study adjunctive hyperbaric oxygen therapy improves the healing of diabetic foot ulcers, and decreases the risk of lower extremity amputations. 180patients (59 patients per arm) with non-healing diabetic ulcers of the lower limb, have either Type 1 or 2 diabetes with a Wagner grading of foot lesions 2, 3 or 4 on lower limb not healing for at least 4 weeks. Patients receive hyperbaric oxygen therapy every day for 6 weeks during the treatment phase and are provided ongoing wound care and weekly assessments. The results of this study will provide detailed information on the efficacy of hyperbaric oxygen therapy for the treatment of non-healing ulcers of the lower limb.

Section C: Studies related to honey on severity of wound among patients with diabetes mellitus.

Sadagatullah.A.et.al.,(2010),This was conducted as a randomized control trial comparing the effects of Manuka honey and Tualang honey on wound granulation of post debridement diabetic foot wounds. Thirty-four patients with Wagner stage II or III diabetic foot ulcers were enrolled in the study. The primary outcome measure which was area of coverage with new granulation tissue was checked in each group after seven days. There was significant difference ($p=0.687$) between Manuka honey and Tualang honey group in terms of mean percentage of granulation tissue surface area after one week of dressing in diabetic foot ulcers (Manuka group 60.7%, Tualang group 57.0%). The result suggests that Tualang honey could be used as an alternative therapeutic agent for diabetic foot wounds with similar beneficial effects as those expected for Manuka honey.

Mohaqaazy.et.al.,(2010), A study was conducted to evaluate the effectiveness of honey on wound healing. Thirty infected diabetic foot wounds were randomly selected. Honey dressing was applied to wounds for 3 months till healing, grafting or failure of treatment. Changes in grade and stage of wounds, using University of Texas Diabetic Wound Classification, as well as surface area were recorded weekly. Bacterial load was determined before and after honey dressing. Complete healing was significantly achieved in 43.3% of ulcers. Decrease in size and healthy granulation was significantly observed in another 43.3% of patients. Bacterial load of all ulcers was significantly reduced after the first week of honey dressing. Failure of treatment was observed in 6.7% of ulcers. This study proves that commercial clover honey is a clinical and cost-effective dressing for diabetic wound in developing countries.

Mohammed.H.et.al.,(2010), conducted study in Saudi Arabia, The aim of the study to identify the top ten natural preparations which are commonly used. A cross-sectional descriptive study of a representative cohort of patients with

diabetes was designed. The most commonly used natural preparations were honey (56.6%), followed by *Commiphora molmol* (myrrh) (37.4%), and *Nigellia sativa* (black seed) (35.1%). The least used was *Lawsonia inermis* (henna) (12.1%). The top ten combinations of natural preparations used topically to treat DFDs were also identified. The use of natural preparations to topically treat DFDs is common among Saudi patients with diabetes. Honey was the most commonly used preparation on its own, or in combination with others.

Bakhotmah.et.al.,(2009), The aim of the study was to identify the pattern of patients' use of CAM products in dealing with diabetic foot disorders topically in a group of diabetic patients. A total of 1634 Saudi diabetics were interviewed. Foot disorders occurred in approximately two thirds of the respondents 1006 (61.6%). Out of the 1006 patients who had foot disorders, 653 reported trying some sort of treatment as 307 patients (47.1%) used conventional topical medical treatment alone, 142 (21.7%) used CAM products alone, and 204 (31.2%) used both treatments. The most commonly used CAM product by the patients was Honey (56.6%) followed by Commiphora Molmol (Myrrh) in (37.4%) and Nigellia Sativa (Black seed) in (35.1%). The least to be used was Lawsonia inermis (Henna) in (12.1%). Honey headed the list as a solo topical preparation or in combination with other herbs namely black seeds and myrrh.

Mehdi.B.et.al.,(2009), The aim of the present study was to evaluate the efficacy of topical application honey in observational studies as well as in controlled clinical trials in the treatment of wound healing. A systematic literature search was carried out from 1966 to 31 July 2008 in Pubmed, Medline, Embase, Cochrane database using the appropriate search key words. We found 5 observational studies with 160 patients. In 963 cases, 10 controlled clinical trials where 511 patients were treated with honey. Efficacy was found highly efficacious in observational studies but in controlled clinical trial

showed its modest efficacy. Most of the patients reported with complete healing of 99% within 2-9 weeks in observational and 56 % in controlled trials and healing was observed within 4-12 weeks time in controlled clinical trials however some of the recent double blind trial shows no superior benefit of honey compare to control. So based on above trials it can be concluded that topical application of honey is useful for the treatment for wound healing but to fully established its efficacy, larger prospective double blind study is required in near future.

Mahdoo.A.et.al.,(2009), The aim of study was honey on wound healing. The study was conducted at department of Orthopaedics, jamshoro from July 2006 to June 2007. Study design was experimental. Total number of patients was 12 (14 feet). There were 8 males (66.67%) and 4 females (33.33%), 2 cases (16.67%) were presented with bilateral diabetic feet. The age range was 35 to 65 years (46 +/- 9.07 years). Amputations of big toe in 3 patients (25%), second and third toe ray in 2 patients (16.67%) and of fourth and fifth toes at the level of meta tarsophalangeal joints were done in 3 patients (25%). One patient (8.33%) had below knee amputation. In his study we observed excellent results in treating diabetic wounds with dressings soaked with natural honey. The disability of diabetic foot patients was minimized by decreasing the rate of leg or foot amputations and thus enhancing the quality and productivity of individual life.

Gethin.et.al.,(2008), The aim of this study was to analyse the changes in surface pH and size of non healing ulcers following application of Manuka honey dressing after 2 weeks, after which wounds re-evaluated. Eight males and nine females with 20 ulcers (3 bilateral) were included: venous, 50% (n = 10); mixed aetiology, 35% (n = 7); arterial, 10% (n = 2) and pressure ulcer, 5% (n = 1). Reduction in wound pH after 2 weeks was statistically significant ($P < 0.001$). Wounds with pH ≥ 8.0 did not decrease in size and wounds with pH ≤ 7.6 had a 30% decrease in size. A reduction in 0.1 pH unit was associated

with an 8.1% reduction in wound size ($P < 0.012$). The use of Manuka honey dressings was associated with a statistically significant decrease in wound pH and a reduction in wound size. Elevated pH readings at the start were associated with minimal reduction in size.

Jull.A.et.al.,(2008),In his study trial aimed to evaluate the safety and effectiveness of honey as a dressing for venous ulcers. This community-based open-label randomized trial allocated people with a venous ulcer to calcium alginate dressings impregnated with Manuka honey or usual care. All participants received compression bandaging. The study were done of 368 participants, 187 were randomized to honey and 181 to usual care. At 12 weeks, 104 ulcers (55.6 per cent) in the honey-treated group and 90 (49.7 per cent) in the usual care group had healed (absolute increase 5.9 (95 per cent confidence interval (c.i.) - 4.3 to 15.7) per cent; $P = 0.258$). Honey-impregnated dressings significantly improve venous ulcer healing at 12 weeks compared with usual care.

sukhrimi.A.et.al.,(2008), he conducted a prospective study to compare the effect of honey dressing for Wagner's grade-II diabetic foot ulcers with controlled dressing group (povidone iodine followed by normal saline). Surgical debridement and appropriate antibiotics were prescribed in all patients. There were 30 patients age between 31 to 65-years-old (mean of 52 years). The mean healing time in the standard dressing group was 15.4 days (range 9-36 days) compared to 14.4 days (range 7-26 days) in the honey group. In conclusion, ulcer healing was not significantly different in both study groups. Honey dressing is a safe alternative dressing for Wagner grade-II diabetic foot ulcers.

Section D: Studies related to nurses role in honey application among patients with diabetic foot ulcer.

Georgana,(2009), she conducted a meta analysis of study on efficacy of honey on desloughing agent. Autolytic debridement is pH sensitive and research has shown that the application of Manuka honey can significantly reduce surface pH of chronic non-healing wounds over a two week period ($p < 0.001$)¹⁹. Whether this effect would contribute to preventing the build up of slough or facilitate its removal is not clear but a reduction in 0.1 pH was associated with an 8.1% reduction in wound size.($p < 0.029$)

CHAPTER - III

METHODOLOGY

This chapter deals with research approach, research design, setting of the study, population, sample, sampling criteria, sample size, sampling technique, instrument and scoring procedure, validity, reliability, pilot study, data collection procedure and plan for data analysis, protection of human subjects.

RESEARCH APPROACH

An evaluative approach was used for this study.

RESEARCH DESIGN

Quasi experimental non equivalent pre test and post test control group design.

SCHEMATIC REPRESENTATION

GROUP	PRETEST	INTERVENTION	POST TEST
Experimental group	0 ₁	X	0 ₂
Control group	0 ₁	-	0 ₂

The symbols used

- 0₁ - Collect demographic variables and pre test to assess the level of severity of wound among patients with diabetes mellitus in experimental and control group.
- X - Application of honey on wound and dressing among patients with diabetes mellitus once in a day daily for 10 days in the morning for experimental group.
- 0₂ - Post test to assess the level of severity of wound among patients with diabetes mellitus in experimental group on 5th and 10th day and for control group on 10th day

SETTING OF THE STUDY

The study was conducted in Government hospital Dharapuram, Tirupur district. It is 150 bedded Hospital. It consists of all specialties includes ENT, cardiology, pediatrics, nephrology, orthopedic, dental, obstetrics and gynecology. It has the services inpatient department and outpatient department. It has a male surgical ward with 20 beds, female surgical ward with 20 beds, male medical ward with 20beds, and female medical ward with 15 beds. The number of inpatient average 30,000 per year. The number of inpatient of surgical ward is an average of 2500 per year, The number of inpatient of medical ward is an average of 2000 per year, and the number of inpatient of diabetic wound in male surgical ward is an average of 7-8 per week and in female surgical ward is an average of 4 -5 per week . The number of outpatient in diabetic clinic is an average of 30 per day.

POPULATION

In this study the target population was patients with diabetes mellitus with diabetic foot ulcer.

SAMPLE

Patients with diabetes mellitus with moderate severity of wound who are admitted in surgical ward in Government hospital, Dharapuram.

CRITERIA FOE SAMPLE SELECTION

Inclusion criteria

- ❖ Both male and female patients.
- ❖ Patients with age group of above 30 years.
- ❖ Patients with moderate severity of wound score (31 – 40)
- ❖ Patient with hospital stay for minimum of 10 days.
- ❖ Patients who are willing to participate in this study

Exclusion criteria

- ❖ Patients who are in critical severity of wound
- ❖ Patients with wound due to surgical amputation
- ❖ Patients with wound other than diabetes mellitus.
- ❖ Diabetes mellitus patient with other complications.

SAMPLE SIZE

Sample size is 60. Among 60 patients 30 were in experimental group and 30 were in control group.

SAMPLING TECHNIQUE

Non probability purposive sampling technique was used to select the sample for the study. The first obtained 30 samples were allotted to experimental group and the next 30 samples were allotted to control group.

INSTRUMENT AND SCORING PROCEDURE**DESCRIPTION OF THE TOOL**

The tool consists of two parts

PART-I

It consists of demographic variables such as age, sex, education, occupation, family monthly income, marital status, area of residence, duration of illness, duration of treatment.

Part-II

Bates- Jensen wound assessment tool (BWAT) by observational method was used to assess the severity of wound. This tool is adopted from Bates & Jenson (1995). It contains 13 items. Such as size, depth, edges, undermining, necrotic tissue type and necrotic tissue amount, exudates type and amount, skin colour surrounding wound, peripheral tissue edema & induration, granulation tissue, epithelialization and rated as minimal, mild, moderate, critical severity of wound. Total score is 65.

SCORING PROCEDURE

Score was interpreted as follows

Severity of wound	BWAT scale score	Percentage (%)
Minimal severity of wound	13-20	20-31
Mild severity of wound	21-30	32-47
Moderate severity of wound	31-40	48-62
Critical severity of wound	41-65	63-100

VALIDITY AND RELIABILITY OF THE TOOL

VALIDITY

The content validity of the tool was established with guide and 5 experts in field of medical surgical nursing, medical diabetologist and statistician. The tool was not modified.

RELIABILITY

The reliability of the tool was established by testing the equivalence using inter rater method and karl pearson formula. The tool was reliable ($r=0.8$).

PILOT STUDY

The pilot study was conducted in Tirupur Government hospital for a period of 10 days. The written permission was obtained from joint director and oral permission was obtained from each study participants prior to the study. Purpose of the study was explained to the participants. Samples were selected by using purposive sampling technique. The patients with moderate severity of wound was selected by using BWAT scale by observational method. The sample size for this study was 10, 5 samples in experimental and 5 samples in control group. In the first day experimental group data pertaining to the demographic variables was collected by interview method then pre test was conducted to the participant by using BWAT Scale and honey application dressing was done. Wound was cleaned with hydrogen per oxide and normal

saline followed by 10ml of honey applied over the wound followed by sterile gauze dressing applied over the wound. It is applied once in a day in the morning for 10 days. Post test was done on 5th, and 10th day by using BWAT scale. For control group data pertaining the demographic variables was collected by interview method then pre test was conducted by using BWAT scale. Post test was done on 10th day.

The pre test mean score was 37.6(SD±0.07), and post test mean score was 27.2(SD±1.68) in experimental group, paired 't' test value was 10.61(table value=2.571). In control group pre test mean score was 35.8(SD±0.84), and post test mean score was 35.7(SD±1.03), paired 't' test value was 6.90(table value=2.571). In experimental group the paired 't' value is higher than the control group. The independent 't' value was 12.32(table value=2.228). The independent 't' value is higher than the table value . Result of the pilot study showed that it is feasible and practicable to conduct the main study.

DATA COLLECTION PROCEDURE

The study was conducted in Government hospital for a period of 5 weeks. The written permission was obtained from Joint Director, Tirupur, Dharapuram and oral permission was obtained from each study participants prior to the study. Purpose of the study was explained to the participants. Samples who were fulfilling the inclusion criteria were chosen by purposive sampling technique. The patients with moderate severity of wound was selected by using BWAT scale by observational method. 30 samples were selected for experimental group and 30 samples were selected for control group. In experimental group 30 samples were selected in 3 groups, 10 samples in each group. Honey application and dressing was continued for 10 days in each group. On the first day the demographic variables of the samples was collected by interview method then the Pre assessment of the wound was done using BWAT scale. Honey application dressing was done for 10 samples for 10 days, and continued for 2 more groups in experimental group. Wound was

cleaned with hydrogen peroxide and normal saline followed by 10 ml of honey applied over the wound followed by sterile gauze dressing. The wound was covered and secured with plaster. It was applied once in a day in the morning for 10 days. The post test was done on 5th and 10th day by using BWAT scale in experimental group. In control group 1-2 samples were selected daily. On the first day demographic variables of samples was collected by interview method then the pre assessment of the wound was done by using BWAT scale. Hospital routine was followed in control group, and the post test was done on the 10th day using BWAT scale. Data obtained was tabulated, analyzed by using descriptive and inferential statistics.

PLAN FOR DATA ANALYSIS

DATA ANALYSIS	METHOD	PURPOSE
Descriptive statistics	Frequency and percentage	To describe the demographic variables of patients with diabetes mellitus
Inferential statistics	Mean and standard deviation.	To assess the pre test level of severity of wound score among patients with diabetes mellitus in experimental and control group.
	Paired 't' test	<p>To assess the post test level of severity of wound score among patients with diabetes mellitus in experimental and control group.</p> <p>To compare the pre and post test level of severity of the wound score among patients with diabetes mellitus in experimental and control group.</p>

	Independent 't' test	To compare the post test level of severity of wound score among patients with diabetes mellitus between experimental and control group.
	Chi square test	To find the association between the post test level of severity of wound score among patients with diabetes mellitus and their selected demographic variables in experimental group.

PROTECTION OF HUMAN SUBJECTS

The research proposal was approved by the dissertation committee prior to conduct the study. The written permission was obtained from the Joint Director, Tirupur. Oral consent were obtained from each subject before starting the data collection.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretations of the data collected to evaluate the effectiveness of honey application on severity of wound among patients with diabetes mellitus.

ORGANISATION OF DATA

The data has been tabulated and organized as follows;

- Section A** : Assess the demographic variables in experimental and control Group among patients with diabetes mellitus.
- Section B** : Assess the pre test and post test level of severity of wound score among patients with diabetes mellitus in experimental and control group.
- Section C** : Comparison of pre and post test level of severity of wound score among patients with diabetes mellitus in experimental group.
- Section D** : Comparison of pre and post test level of severity of wound score among patients with diabetes mellitus in control group.
- Section E** : Comparison of post test level of severity of wound score among patients with diabetes mellitus between experimental and control group.
- Section F** : Find the Association between post test level of severity of wound score among patients with diabetes mellitus and their selected demographic variables in experimental group.

**SECTION A : DISTRIBUTION OF DEMOGRAPHIC VARIABLES
AMONG PATIENTS WITH DIABETES MELLITUS
IN EXPERIMENTAL AND CONTROL GROUP**

Table 1 Frequency and percentage distribution of demographic variables among patients with diabetes mellitus in experimental group and control group

$n_1 = 30, n_2 = 30$

Sl. No	Demographic Variables	Experimental Group		Control group	
		F	%	F	%
1	Age (In Years)				
1.1	30 – 40	3	10	2	7
1.2	41 – 50	12	40	9	30
1.3	51 – 60	10	33	15	50
1.4	61 yrs and above	5	17	4	13
2	Sex				
2.1	Male	20	67	20	67
2.2	Female	10	33	10	33
3	Education				
3.1	No formal Education	2	7	6	20
3.2	Primary Education	20	67	11	37
3.3	High school Education	5	16	12	40
3.4	Higher secondary Education	3	10	1	3
4	Occupation				
4.1	Coolie	15	50	17	57
4.2	House wife	9	30	8	27
4.3	Self employee	5	17	5	16
4.4	Government employee	1	3	0	0

5	Marital status				
5.1	Single	1	3	1	3
5.2	Married	27	90	27	90
5.3	Widow	2	7	0	0
5.4	Divorce	0	0	2	7
6	Family Monthly Income				
6.1	Rs.500 – Rs. 1000	24	80	30	100
6.2	Rs.1001 – Rs. 2000	6	20	0	0
6.3	Rs. 2001 – Rs. 3000	0	0	0	0
6.4	3001and above	0	0	0	0
7	Area of Residence				
7.1	Urban	25	83	26	87
7.2	Rural	5	17	4	13
8	Duration Of Illness				
8.1	0 – 1 year	0	0	19	63
8.2	2– 3 years	9	30	6	20
8.3	> 4 years	21	70	5	17
9	Duration Of treatment				
9.1	0 – 1 year	0	0	19	63
9.2	2– 3 years	9	30	6	20
9.3	> 4 years	21	70	5	17

Table 1 shows distribution of patients with diabetes mellitus according to their age group depicts in experimental group the majority 12(40%) of patients belonged to the age group of above 41-50years, 10 (33%) were in the age group of 51-60 years, 5 (17%) were in the age group of more than 60years and least 3 (10%) were in the age group of 30-40 years. In control group highest percentage 15 (50%) of patients belonged to the age group of above 51-60years, 9(30%) were in the age group of 41-50 years, 4 (13%) were in the age

group of 61 years and above and least 2 (7%) were in the age group of 30-40 years. (fig:2).

Percentage distribution of patients with diabetes mellitus in experimental group according to their sex reveals the majority 20(67%) were male, 10 (33%) were female. In control group majority 20(67%) were male, 10 (33%) were female. (fig:3).

With regard to education in experimental group, majority of patients with diabetes mellitus 20(67%) had primary education, 5 (16%) had high school education and 3(10%) had higher secondary education and (7%) had no formal education. In control group majority of patients 12 (40%) had high school education, 11 (37%) had primary education and 6 (20%) had no formal education and 1 (3%) had higher secondary education.(fig:4).

With regard to occupation in experimental group majority of patients with diabetes mellitus 15 (50%) were coolie workers, and 9 (30%) were house wife, 5 (16%) were self employee, and 1(4%) were government employee. In control group most of the patients 17(57%) were coolie workers, and 8 (27%) were house wife, 5 (16%) were self employee. (fig:5).

With regard to marital status in experimental group majority of the patients with diabetes mellitus 27(90%) were married, 2 (7%) were widow, 1(3%) were single and none of them were divorced. In control group majority of the patients 27(90%) were married, 2 (7%) were divorced, 1(3%) were single and none of them were widow.(fig:6).

With regard to family monthly income in experimental group majority of patients with diabetes mellitus 24(80%) were between Rs 500– Rs 1000 and 6 (20%) were between Rs 1001 – Rs 2000, none of them were in rs2001-3000

and 3001 and above. In control group patients with diabetes mellitus all 30 (100%) were between Rs 500– Rs 1000. (fig:7).

With regard to area of residence in experimental group majority of patients with diabetes mellitus 25 (83%) were from urban area and 5(17%) were from rural area. In control group majority patients with diabetes mellitus 26(87%) were from urban area and 4(13%) were from rural area. (fig:8).

With regard to Duration of illness majority of the patients with diabetes mellitus 21(70%) were more than 4years, 9(30%) were between the year of 2-3 years and none of them between 0-1years. In control group majority of the patients with diabetes mellitus 19(63%) were 0-1years, 6(20%) were between 2-3 years, 5(17%) were more than 4years. (fig:9).

With regard to Duration of treatment majority of the patients with diabetes mellitus 21(70%) were more than 4years, 9(30%) were between the year of 2-3 years and none of them between 0-1years. In control group majority of the patients with diabetes mellitus 19(63%) were 0-1years, 6(20%)were between 2-3 years, 5(17%) were more than 4years.(fig:10).

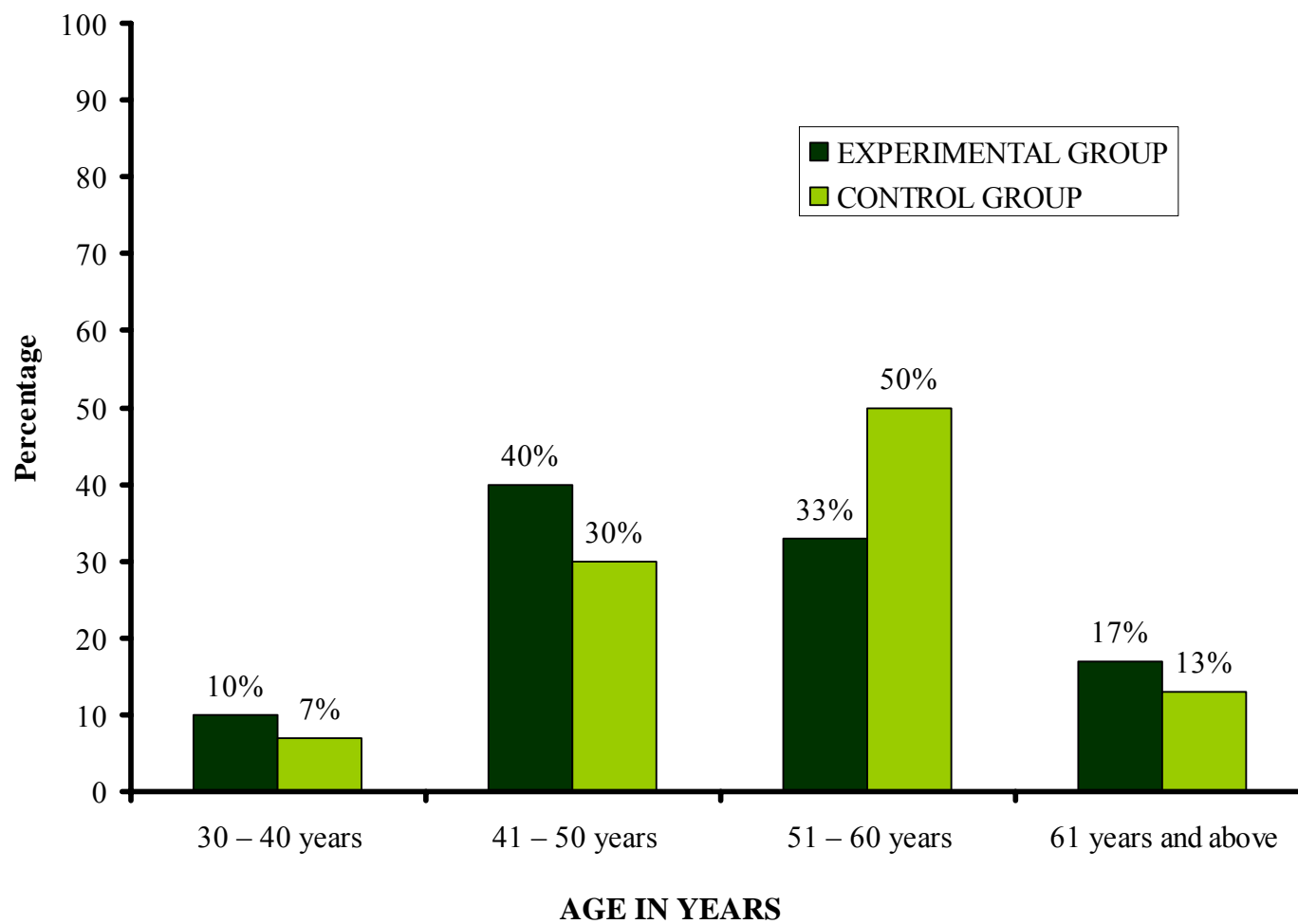


Fig : 2 Percentage distribution according to age among patients with diabetes mellitus in experimental and control group

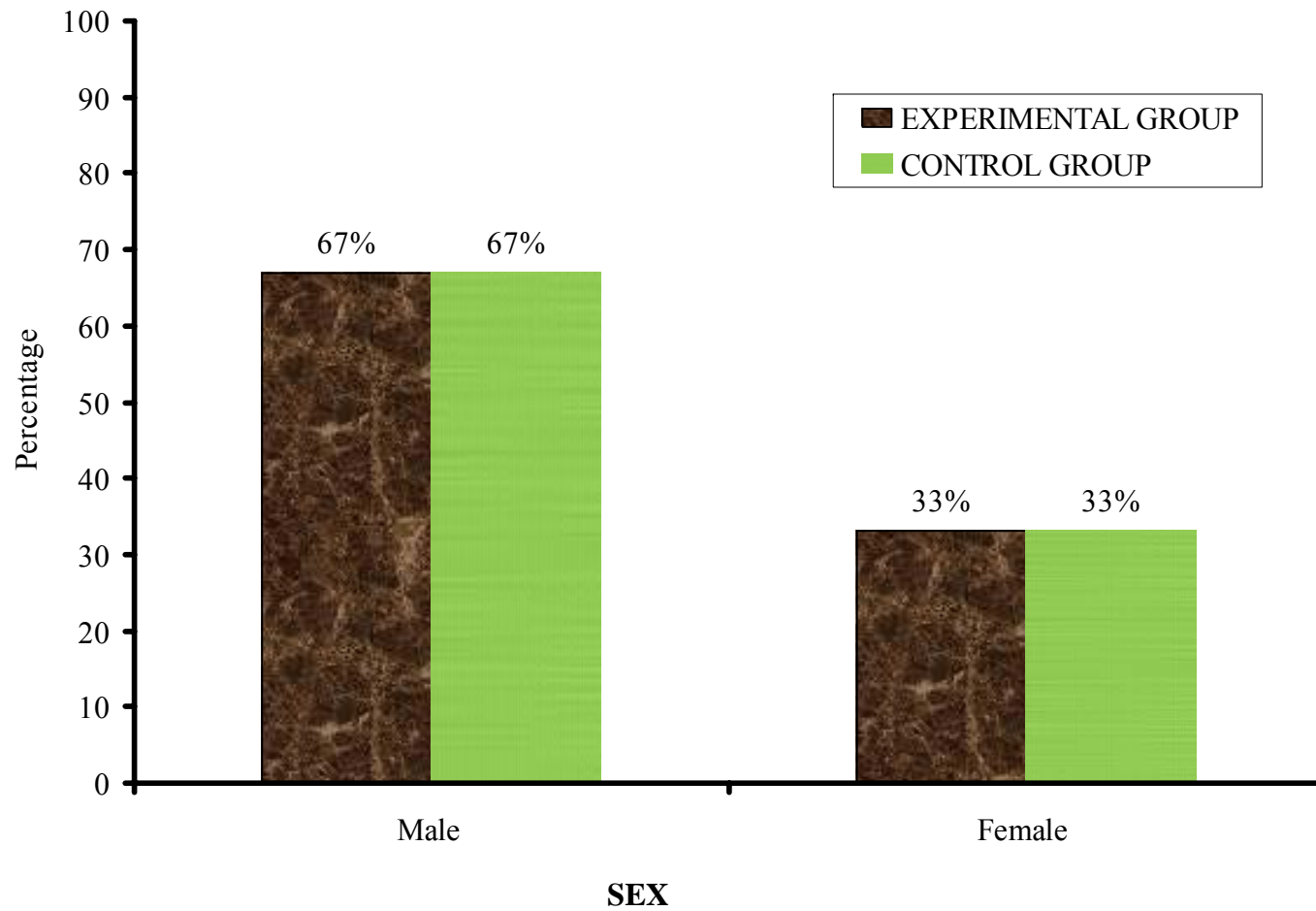


Fig : 3 Percentage distribution according to sex among patients with diabetes mellitus in experimental and control group

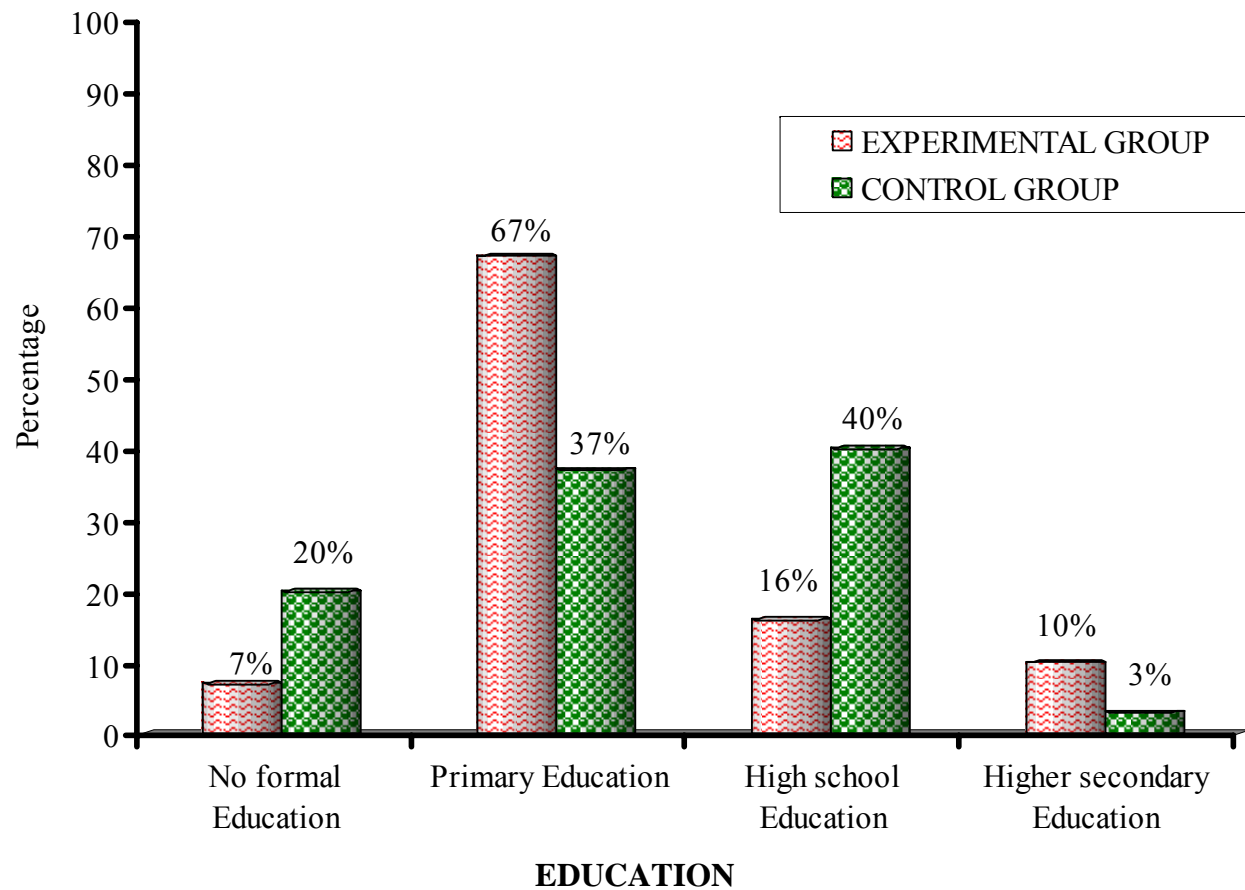


Fig : 4 Percentage distribution according to education among patients with diabetes mellitus in experimental and control group

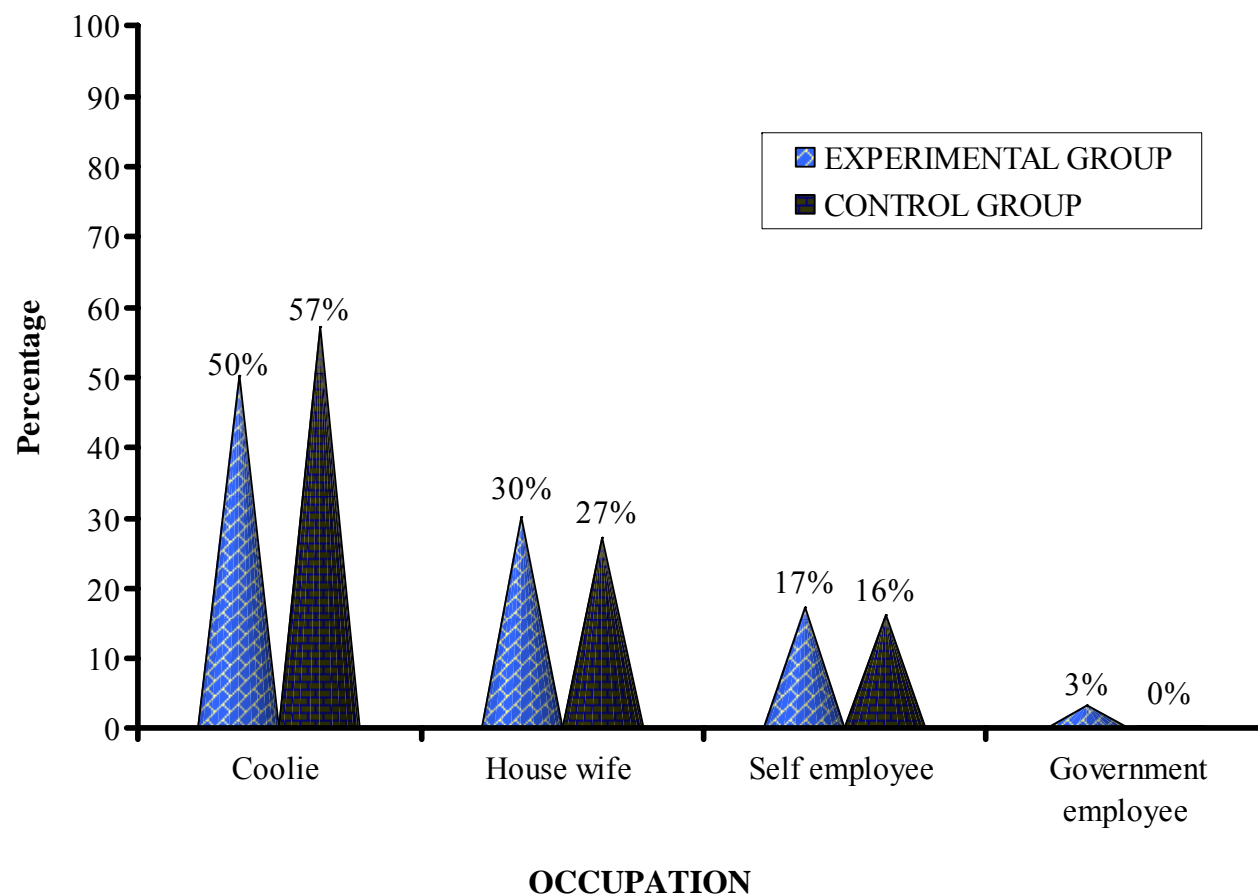


Fig : 5 Percentage distribution according to occupation among patients with diabetes mellitus in experimental and control group

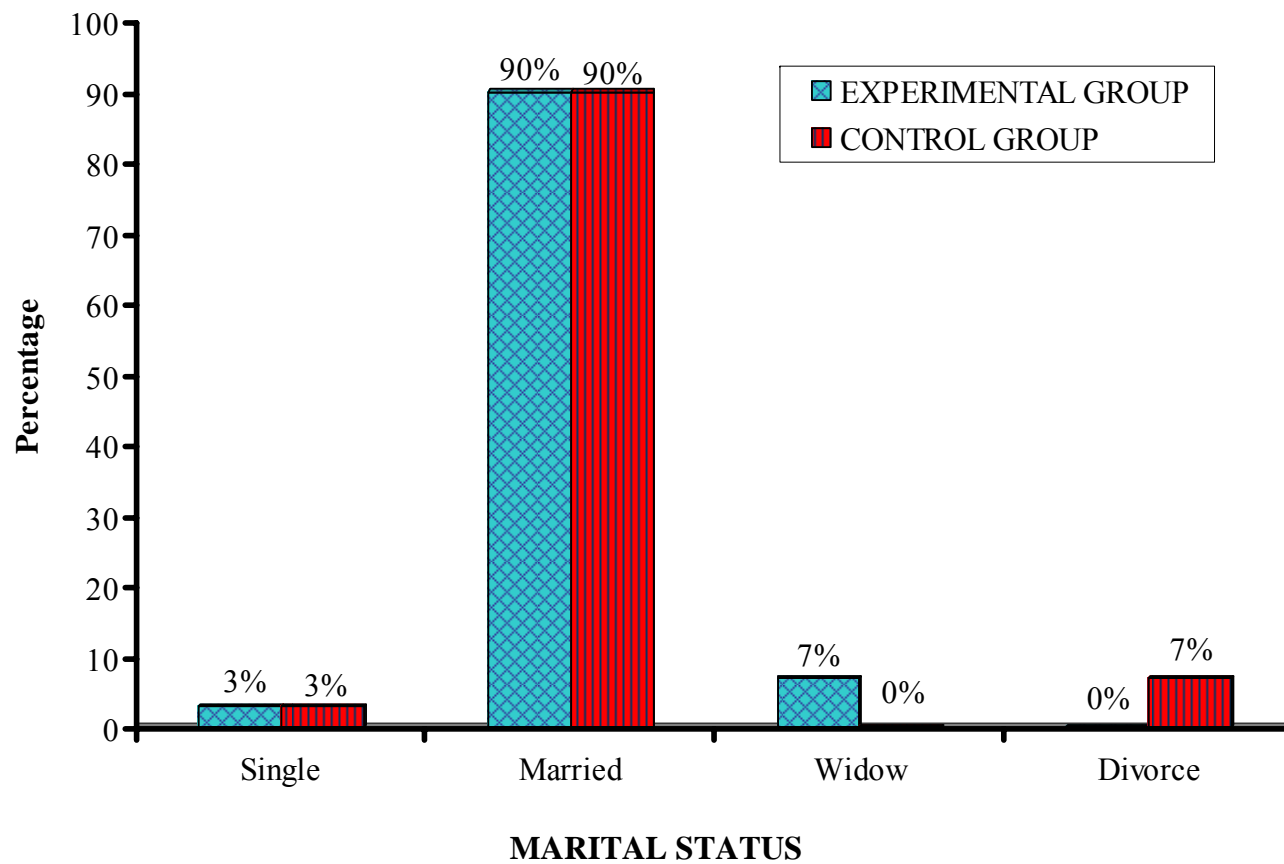


Fig : 6 Percentage distribution according to marital status among patients with diabetes mellitus in experimental and control group

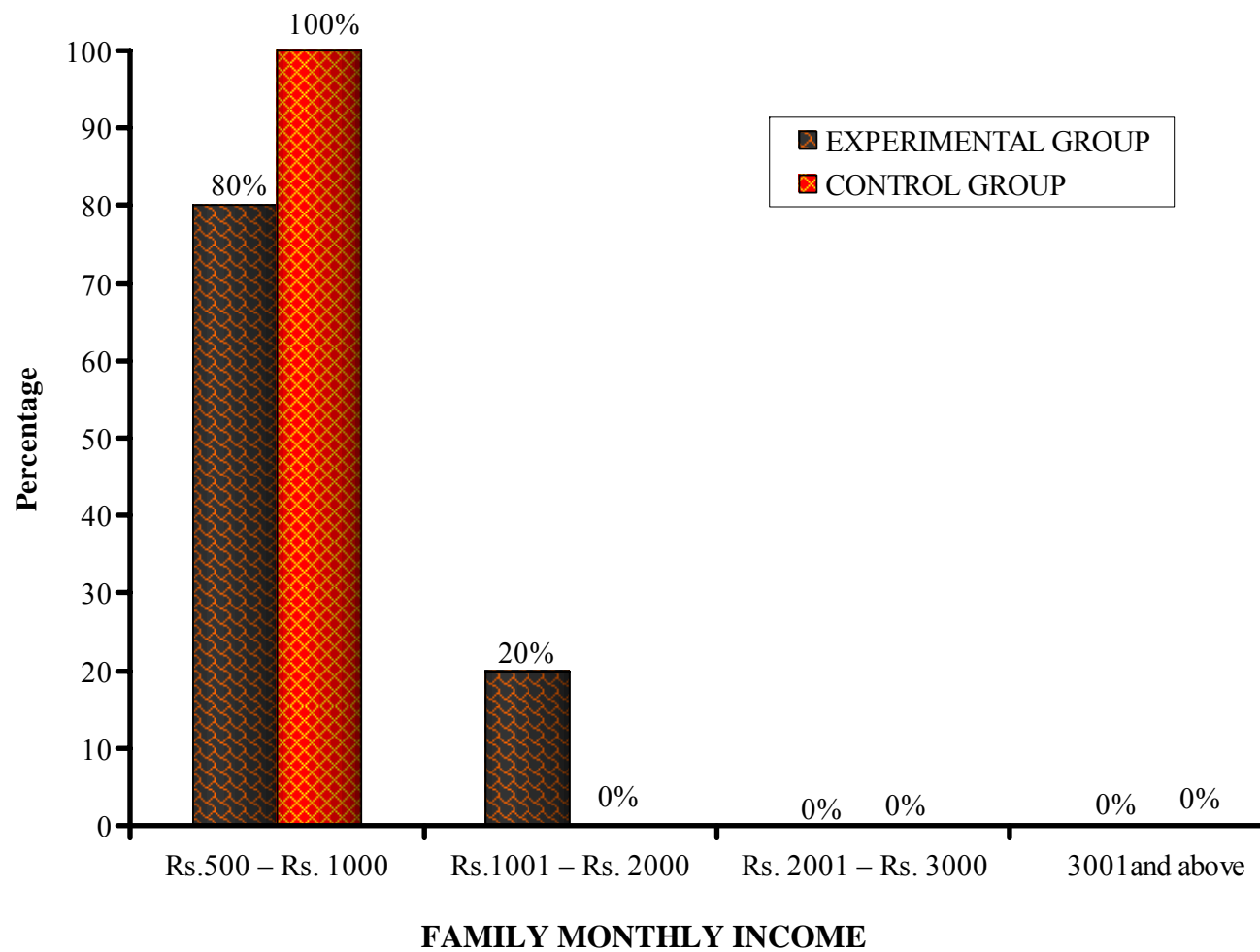


Fig : 7 Percentage distribution according to family monthly income among patients with diabetes mellitus in experimental and control group

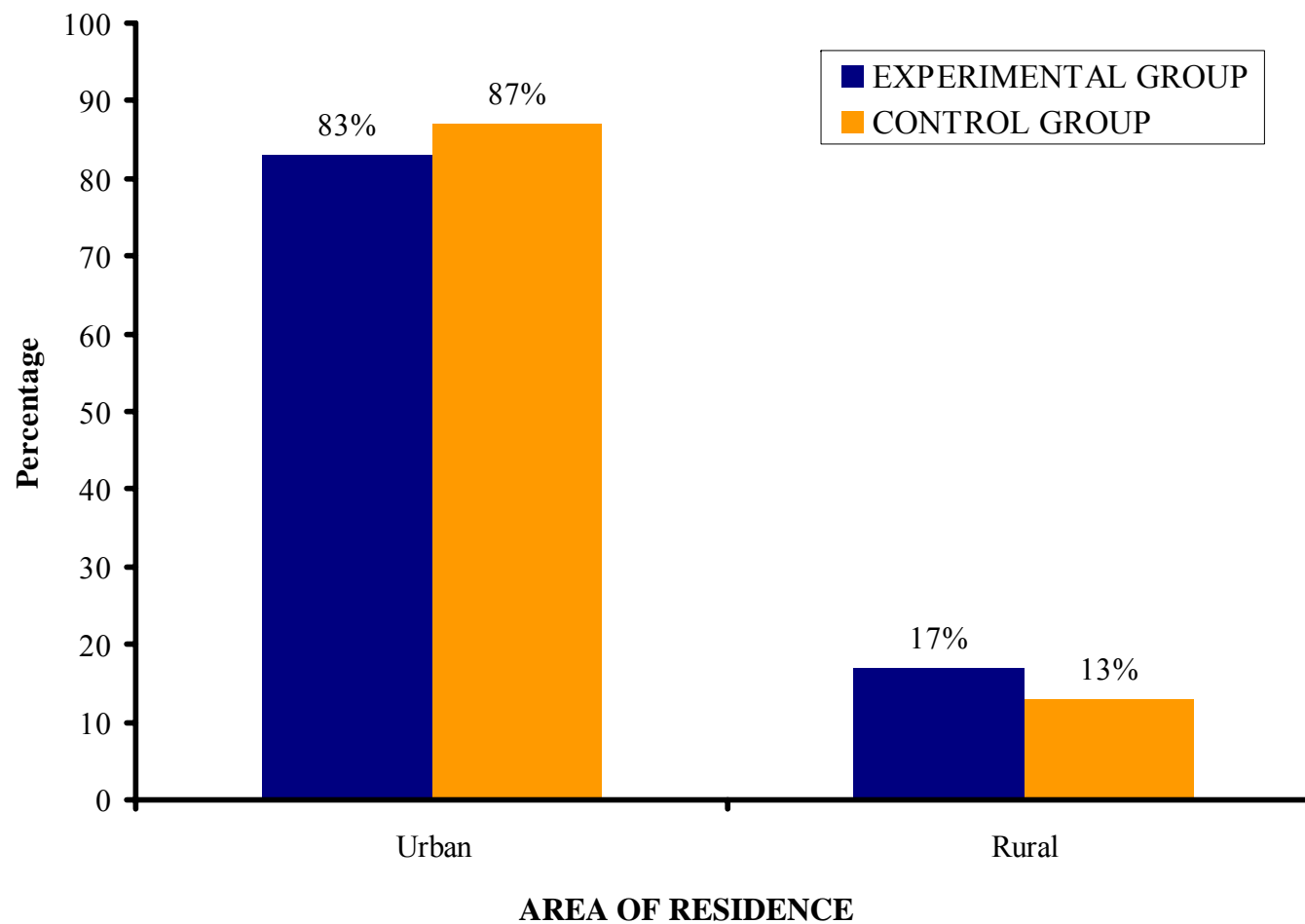


Fig : 8 Percentage distribution according to area of residence among patients with diabetes mellitus in experimental and control group

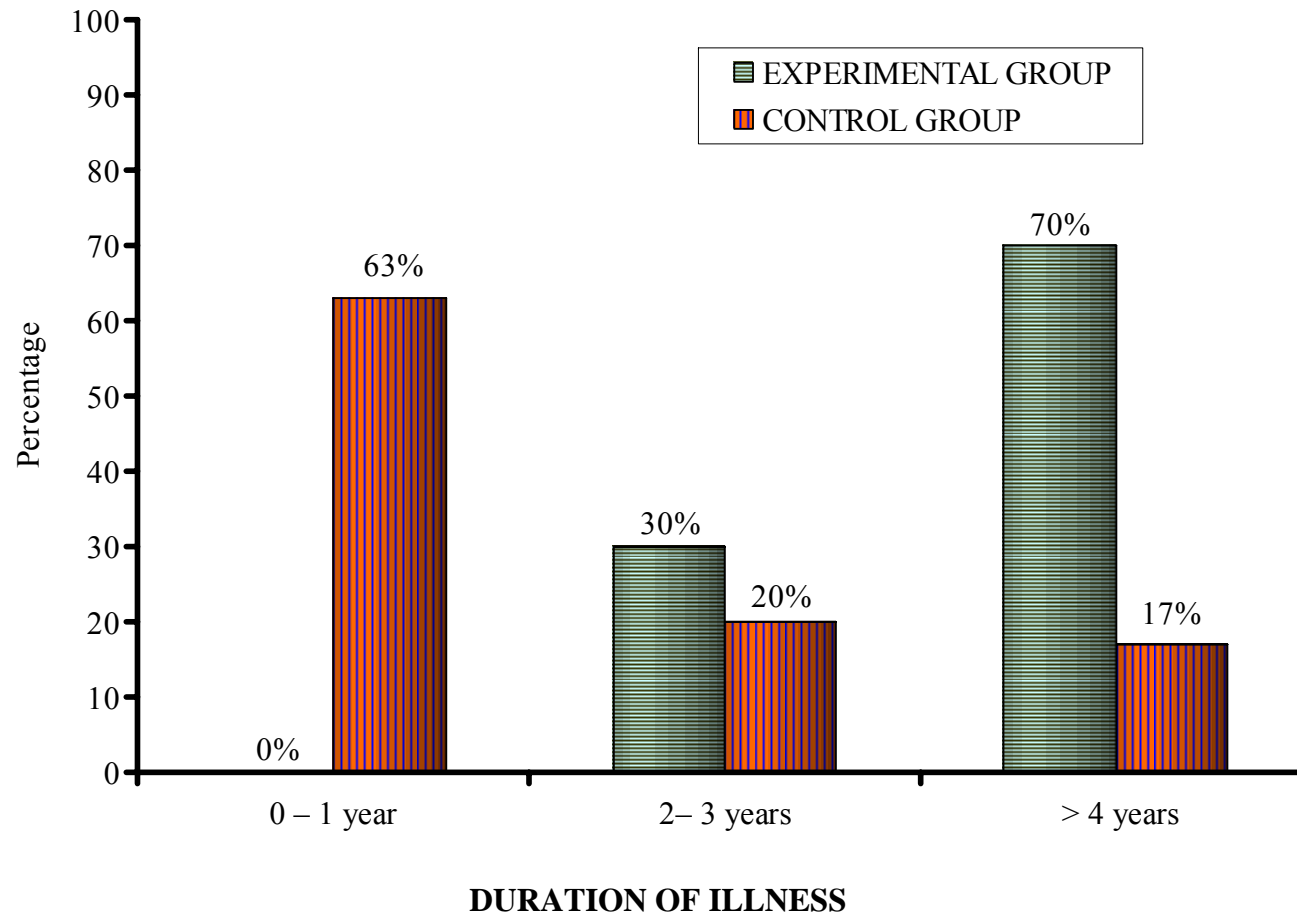


Fig : 9 Percentage distribution according to duration of illness among patients with diabetes mellitus in experimental and control group

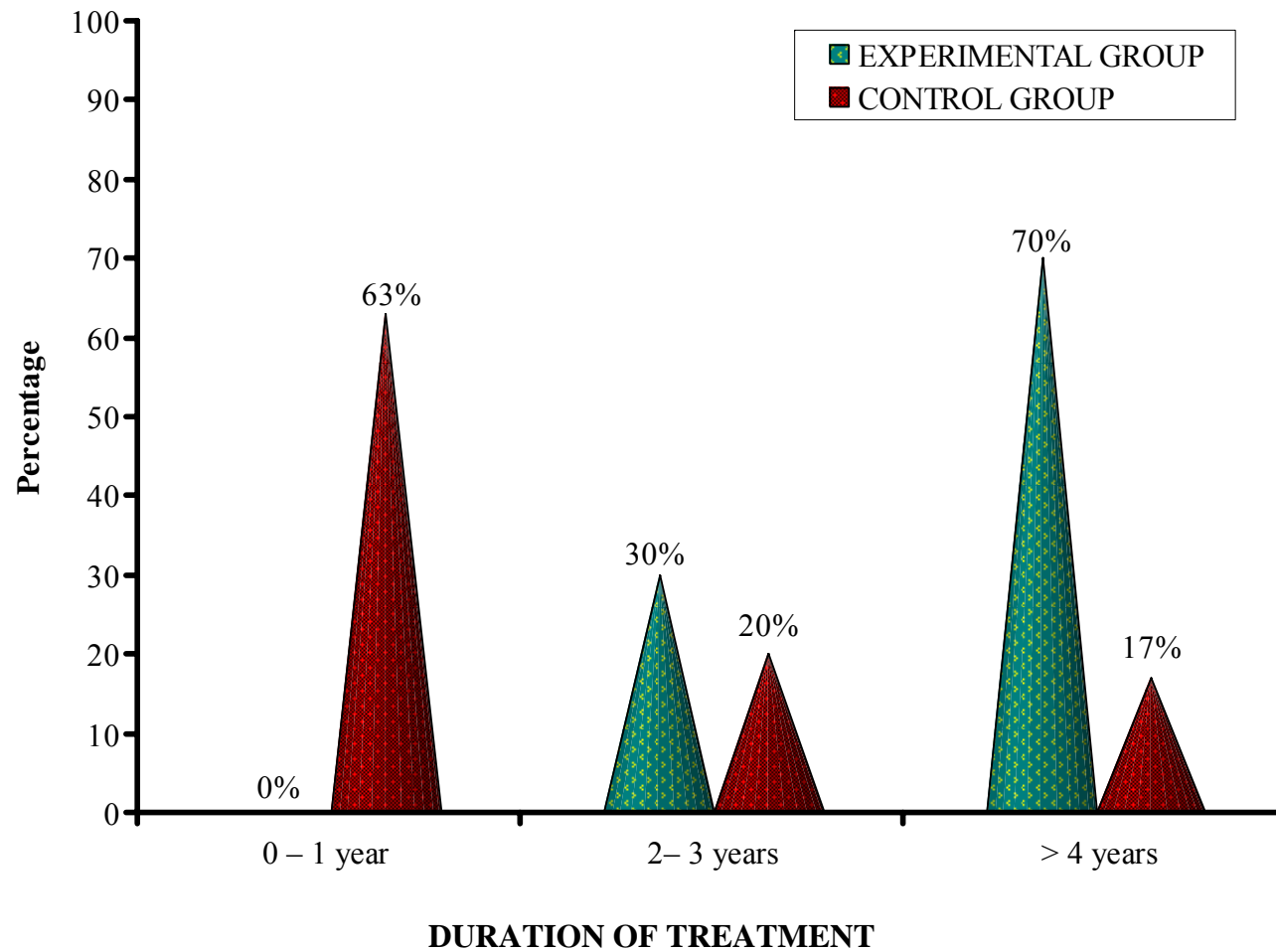


Fig : 10 Percentage distribution according to duration of treatment among patients with diabetes mellitus in experimental and control group

**SECTION B: ASSESS THE PRE TEST AND POST TEST LEVEL
OF SEVERITY OF WOUND SCORE AMONG
PATIENTS WITH DIABETES MELLITUS IN
EXPERIMENTAL GROUP AND CONTROL GROUP**

Table: 2 : Frequency and percentage distribution of pre test and post
test level of severity of Wound score among patients with
diabetes mellitus in experimental group

n=30

S. No	Severity of wound	Pre test		Post test	
		F	%	F	%
1	Minimal severity of wound (13 -20)	0	0	3	10
2	Mild severity of wound (21 -30)	0	0	27	90
3	Moderate severity of wound (31 -40)	30	100	0	0
4	Critical severity of wound (41 -65)	0	0	0	0

Table (2) shows in pre test majority 30(100%) had moderate severity of wound. Where as in post test majority 27(90%) had mild severity of wound, and 3(10%) had minimal severity of wound. (Fig:11)

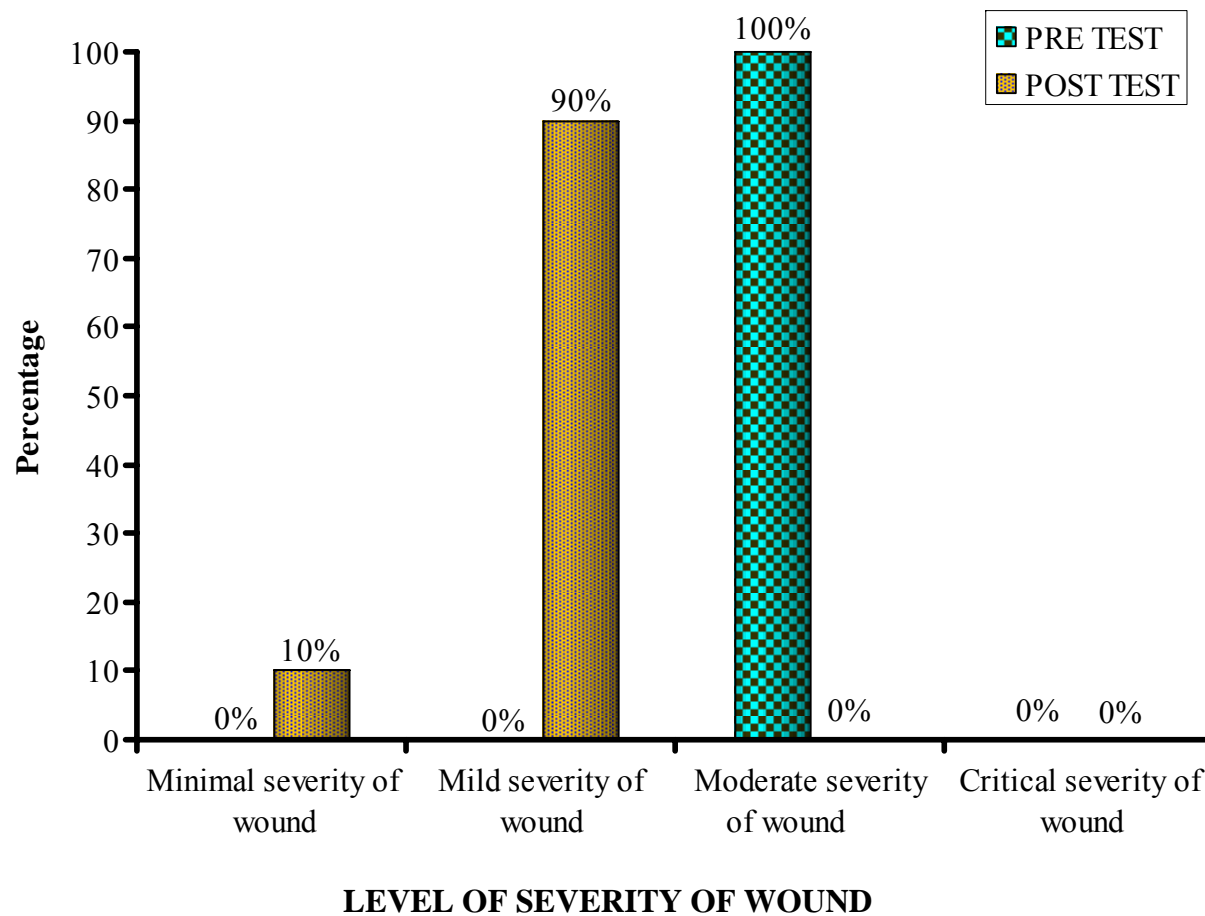


Fig : 11 Percentage distribution of pre and post level of severity of wound score among patients with diabetes mellitus in experimental group.

Table 3 : Frequency and percentage distribution of pre and post test level of severity of wound score among patients with diabetes mellitus in control group.

n=30

S. No	Severity of wound	Pre test		Post test	
		F	%		%
1	Minimal severity of wound (13 – 20)	-	-	-	-
2	Mild severity of wound (21 – 30)	-	-	5	17
3	Moderate severity of wound (31 -40)	30	100	25	83
4	Critical severity of wound (41 – 65)	-	-	-	-

Table (2) shows that in pre test 30(100%) had moderate severity of wound, where as in post test 25(83%) had moderate severity of wound, 5(17%) had mild severity of wound. (fig;12)

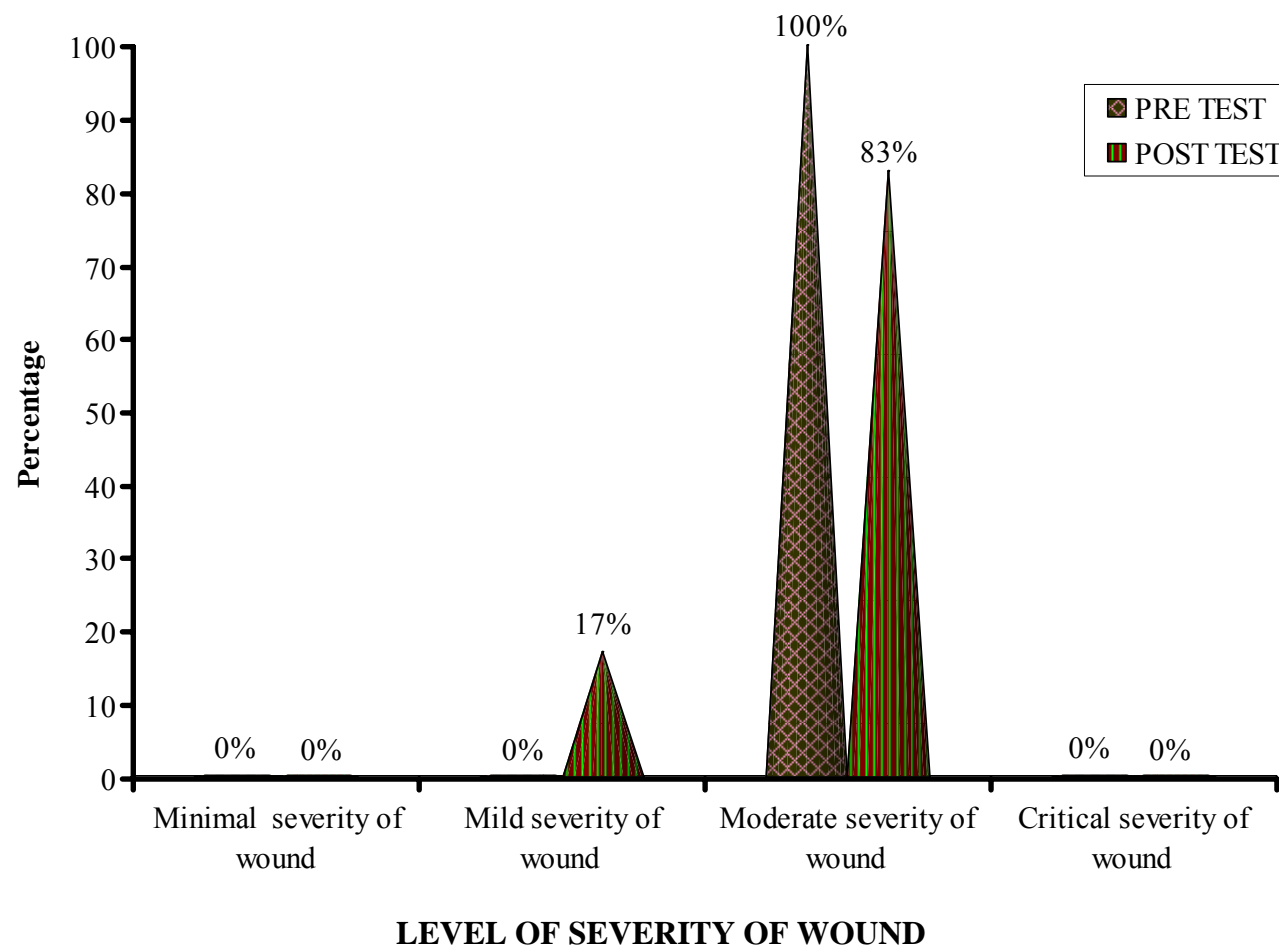


Fig : 12 Percentage distribution of pre and post level of severity of wound score among patients with diabetes mellitus in control group.

SECTION C: COMPARISON OF PRE TEST AND POST TEST LEVEL OF SEVERITY OF WOUND SCORE AMONG PATIENTS WITH DIABETES MELLITUS IN EXPERIMENTAL GROUP.

TABLE 4: Compare the mean, mean difference, standard deviation, paired 't' test value among patients with diabetes mellitus in experimental group.

n=30

Variables	Mean	Mean difference	SD	Paired 't' Value	Table Value
Pre test	36.67	11.8	2.48	35.32	2.010
Post test	24.87		2.46		

df =29 (P< 0.05)

The Table (4) shows that the mean pretest severity of wound score in experimental group was 36.67(SD \pm 2.48) and post test mean score was 24.87 (SD \pm 2.46). The post test mean score (24.87) was lower than the pre test mean score (36.67). The mean difference between pre test and post test score was 11.8. The 't' value was 35.32 which was significant at < 0.05 level in the experimental group.

SECTION D: COMPARISON OF PRE TEST AND POST TEST LEVEL OF SEVERITY OF WOUND SCORE AMONG PATIENTS WITH DIABETES MELLITUS IN CONTROL GROUP.

TABLE 5 : Compare the mean, standard deviation, mean difference and paired 't' test value among patients with diabetes mellitus in control group.

n = 30

Variables	Mean	Mean difference	SD	Paired 't' Value	Table Value
Pre test	37.53	4.11	1.38	15.51	2.010
Post test	33.42		2.28		

df = 29

(P < 0.05)

The Table (3) shows that the mean pre test severity of wound score in control group 37.53(SD \pm 1.38) and post test mean score 33.42(SD \pm 2.28) respectively. The post mean score 33.42 was lower than the pre test mean score 37.53. The mean difference between pre test and post test score was 4.11. The 't' value 15.51 which was significant at 0.05 level in the control group.

SECTION E: COMPARISON OF POST TEST LEVEL OF SEVERITY OF WOUND SCORES AMONG PATIENTS WITH DIABETES MELLITUS BETWEEN EXPERIMENTAL AND CONTROL GROUP.

Table 6 : Mean, standard deviation and 't' value among patients with diabetes mellitus between experimental group and control group.

$$n_1 = 30, n_2 = 30$$

Groups	Post Test Score			Independent 't' Value	Table Value
	Mean	Mean difference	SD		
Experimental Group	24.87	8.55	2.46	42.75	1.96
Control Group	33.42		2.28		

df=58,

(P< 0.05)

The Table (3) shows that the mean post test severity of wound score in experimental group 24.87(SD \pm 2.46), and mean post test severity of wound score in control group 33.42(SD \pm 2.28) respectively. The mean post test score in experimental group 24.87 was lower than the post test mean scores 33.42. The post test mean difference score between experimental group and control group was 8.55. The independent 't' value 42.75 which was significant at 0.05level in the experimental group.

SECTION F : FIND THE ASSOCIATION BETWEEN THE POST TEST LEVEL OF SEVERITY OF WOUND SCORE AMONG PATIENTS WITH DIABETES MELLITUS AND THEIR SELECTED DEMOGRAPHIC VARIABLES IN EXPERIMENTAL GROUP.

Table 7 : Association between the post test level of severity of wound scores among patients with diabetes mellitus and their selected demographic variables in experimental group.

n=30

S. No	Demographic Variables	Severity of wound				χ^2	Table value	Inference
		Minimal		Mild				
1	Age (In Years)							
1.1	30 – 40	0	0	3	10	8.0	7.82 df=3	S
1.2	41 – 50	3	10	9	30			
1.3	51 – 60	0	0	10	33			
1.4	61 years and above	0	0	5	17			
2	Sex							
2.1	Male	1	3	19	63	1.67	3.84 df= 1	NS
2.2	Female	2	7	8	27			
3	Education							
3.1	No formal education	0	0	2	7	14.04	7.82 df=3	S
3.2	Primary education	1	3	19	63			
3.3	High school education	0	0	5	17			
3.4	Higher secondary education	2	7	1	3			
4	Occupation							
4.1	Coolie	0	0	15	50	4.83	7.82 df=3	NS
4.2	House wife	2	7	7	24			
4.3	Self employee	1	3	4	13			
4.4	Government employee	0	0	1	3			

5	Marital status							
5.1	Single	0	0	1	3			
5.2	Married	3	10	24	80	3.7	5.99 df=2	N S
5.3	Widow	0	0	2	7			
5.4	Divorce	0	0	0	0			
6	Family monthly income							
6.1	Rs.500–Rs. 1000	3	10	21	70			
6.2	Rs.1001–Rs. 2000	0	0	6	20	0.837	3.84 df= 1	NS
6.3	Rs. 2001–R. 3000	0	0	0	0			
6.4	3001 and above	0	0	0	0			
7	Area of Residence							
7.1	Urban	3	10	22	73	0.67	3.84	
7.2	Rural	0	0	5	17		df=1	NS
8	Duration of illness							
8.1	0-1 years	0	0	0	0		3.84	
8.2	2-3years	1	3	8	27		df= 1	
8.3	more than 4years	2	7	19	63	0.515		NS
9	Duration of treatment							
9.1	0-1 years	0	0	0	0		3.84	
9.2	2-3years	1	3	8	27	0.515	df=1	NS
9.3	more than 4years	2	7	19	63			

S= significant

NS= non significant

The table (7) chi-square was calculated to find out the association between the post test level of the severity of wound among patients with diabetes mellitus and their selected demographic variables in experimental group. There was no significant association with demographic variables except for age ($\chi^2=8.0$), and education ($\chi^2=14.04$).

CHAPTER –V

DISCUSSION

This chapter discussed the findings of the study as per the objectives.

The findings of the study are discussed according to the objectives as follows

- a) Assess the demographic variables in experimental and control Group among patients with diabetes mellitus.
- b) Assess the pre test and post test level of severity of wound score among patients with diabetes mellitus in experimental and control group.
- c) Comparison of pre and post test level of severity of wound score among patients with diabetes mellitus in experimental group.
- d) Comparison of pre and post test level of severity of wound score among patients with diabetes mellitus in control group.
- e) Comparison of post test level of severity of wound score among patients with diabetes mellitus between experimental and control group
- f) Find the Association between post test level of severity of wound scores among patients with diabetes mellitus and their selected demographic variables in experimental group.

Distribution of the sample characteristics

The demographic characteristics of patients with diabetes mellitus are age, sex, education, occupation, marital status, family monthly income, area of residence, duration of illness and duration of treatment.

Distribution of patients with diabetes mellitus according to their age group depicts in experimental group the majority 12(40%) of patients belonged to the age group of above 41-50years, and least 3 (10%) were in the age group of 30-40 years. In control group majority 15 (50%) of patients belonged to the age group of above 51-60years, and least 2 (7%) were in the age group of 30-40 years.

Percentage distribution of patients with diabetes mellitus in experimental group according to their sex reveals the majority 20(67%) were male and least 10 (33%) were female. In control group highest percentage 20(67%) were male and least 10 (33%) were female.

With regard to education in experimental group, majority of patients with diabetes mellitus 20(67%) had primary education, and least 3(10%) had higher secondary school education. In control group majority of patients 12 (40%) had high school education, and least 1 (3%) had higher secondary education.

With regard to occupation in experimental group majority of patients with diabetes mellitus 15 (50%) were coolie workers, and least 5 (16%) were self employee. In control group most of the patient 17(57%) were coolie workers, and least 5 (16%) were self employee.

With regard to marital status in experimental group most of the patients with diabetes mellitus 27(90%) were married and least 1(3%) were single. In control group most of the patients 27(90%) were married, and least 1(3%) were single.

With regard to family monthly income in experimental group majority of patients with diabetes mellitus 24(80%) were between Rs 500– Rs 1000 and least 6 (20%) were between Rs 1001 – Rs 2000. In control group patients with diabetes mellitus all 30 (100%) were between Rs 500– Rs 1000.

With regard to area of residence in experimental group majority of patients with diabetes mellitus 25 (83%) were from urban area and 5(17%) were from rural area. In control group majority patients with diabetes mellitus 26(87%) were from urban area and 4(13%) were from rural area.

With regard to Duration of illness majority of the patients with diabetes mellitus 21(70%) were more than 4years, and least 9(30%) were between the year of 2-3 years. In control group majority of the patients with diabetes mellitus 19(63%) were 0-1 years, and least 5(17%) were more than 4years.

With regard to Duration of treatment majority of the patients with diabetes mellitus 21(70%) were more than 4years, and least 9(30%) were between the year of 2-3 years and none of them between 0-1years. In control group majority of the patients with diabetes mellitus 19(63%) were 0 - 1years, and least 5(17%) were more than 4years.

The findings of the study are discussed according to the objectives follows

1. Assess the pre and post test level of severity of wound score among patients with diabetes mellitus in experimental group
2. Comparison of the pre and post test level of severity of wound score among patients with diabetes mellitus in experimental and control group
3. Compare the post test level of severity of wound score among patients with diabetes mellitus between experimental and control group.
4. Association of post level of severity of wound score among patients with diabetes mellitus and their selected demographic variables in experimental group.

OBJECTIVE:1 Assess the pre and post test level of severity of wound score among patients with diabetes mellitus in experimental group.

Majority of the patients with diabetes mellitus in experimental group 27(90%) of them had mild severity of wound after Manuka honey application, 3(10%) of them had minimal severity of wound and none of them had moderate and critical severity of wound respectively, where as in control group most of the patients with diabetes mellitus 25(83%) of them had moderate

severity of wound, 5(17%) of them had mild severity of wound and none of them had minimal and critical severity of wound among patients with diabetes.

This findings is consistent with the findings supported by a study conducted by (Gethin.et.al.,(2009), Reduction in Wounds with pH ≥ 8.0 did not decrease in size and wounds with pH ≤ 7.6 had a 30% decrease in size. A reduction in 0.1 pH unit was associated with an 8.1% reduction in wound size ($P < 0.012$). The use of Manuka honey dressings was associated with a statistically significant decrease in wound pH and a reduction in wound size.

OBJECTIVE:2 Comparison of the pre test and post test level of severity of wound score among patients with diabetes mellitus in experimental and control group

The mean pretest severity of wound score in experimental group was 36.67(SD \pm 2.48) and post test mean score was 24.87 (SD \pm 2.46). The mean difference between pre test and post test score was 11.8. The 't' value was 35.32 which was significant at < 0.05 level in the experimental group.

This findings is consistent with the findings supported by a study conducted by mohaqazyet.,al,(2009), Complete healing was significantly achieved in 43.3% of ulcers. Decrease in size and healthy granulation was significantly observed in another 43.3% of patients. Bacterial load of all ulcers was significantly reduced after the first week of honey dressing. Failure of treatment was observed in 6.7% of ulcers.

Therefore the research hypothesis H_1 that is the mean post test level of severity of wound score is significantly lower than the mean pre test level of severity of wound score in experimental group was accepted.

The mean pre test severity of wound score in control group 37.53(SD \pm 1.38) and post test mean score 33.42(SD \pm 2.28) respectively. The mean difference between pre test and post test score was 4.11. The 't' value 15.51 which was significant at 0.05 level in the control group.

OBJECTIVE: 3 Compare the post test score of severity of wound among patients with diabetes mellitus between experimental and control group.

The mean post test severity of wound score in experimental group 24.87(SD \pm 2.46), and mean post test severity of wound score in control group 33.42 (SD \pm 2.28) respectively. The post test mean score in experimental group 24.87 was lower than the post test mean score in control group 33.42. The independent 't' value (42.75) which was significant at 0.05level in the experimental group.

This findings is consistent with the findings supported by a study conducted by **Jull.A.et.al.,(2008)**, in this study were 187 were randomized to honey and 181 to usual care. At 12 weeks, 104 ulcers (55.6 per cent) in the honey-treated group and 90 (49.7 per cent) in the usual care group had healed (absolute increase 5.9 (95 per cent confidence interval (c.i.) - 4.3 to 15.7) per cent; P = 0.258). Honey-impregnated dressings significantly improve venous ulcer healing at 12 weeks compared with usual care.

Therefore the research hypothesis H₂ that is the mean post test level of severity of wound score was lower than the mean post test level of severity of wound score in control group was accepted.

OBJECTIVE:4 Association of severity of wound among patients with diabetes mellitus with their selected demographic variables.

It revealed there was no association was found between post test severity of wound when compared to except age ($\chi^2=8.0$), education ($\chi^2=14.04$).

Therefore the research hypothesis H_3 that is there is significant association between the post test level severity of wound score among patients with diabetes mellitus with their selected demographic variables in experimental group was rejected except for age ($\chi^2=8.0$), and education($\chi^2=14.04$).

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATION, RECOMMENDATIONS AND LIMITATION

SUMMARY OF THE STUDY

The aim of the study was to evaluate the effectiveness of honey application on severity of wound among patient with diabetes mellitus. Quasi experimental non equivalent pre test and post test control group only design was used for the study which was conducted in Government hospital Dharapuram. The conceptual frame work was based on modified Widen bach's (1964) helping art clinical nursing theory. The sample was 60 out of which 30 were in the experimental group and 30 were in control group. The Samples were selected by using purposive sampling method. The severity of wound was assessed by Bates-Jenson wound assessment scale. The patients with moderate severity of wound was selected by using BWAT scale. 30 samples were selected for experimental and 30 samples were selected for control group. In experimental group 30 samples were selected in 3 groups, 10 samples in each group. Honey application and dressing was continued for 10 days in each group. On the first day the demographic variables of the samples were collected by interview method then the Pre assessment wound of the wound was done by using BWAT scale. Honey application dressing was done for 10 samples for 10 days, and continued for 2 more groups in experimental group. Wound was cleaned with hydrogen per oxide and normal saline followed by 10 ml of honey applied over the wound followed by sterile gauze is applied over the wound. The wound was covered and secured with plaster. It is applied once in a day in the morning for 10 days. The post test was done on 5th and 10th day by using BWAT scale in experimental group. In control group 1-2 samples were selected every day. On the first day demographic variables of samples were collected by interview method then the pre assessment of the wound was done by using BWAT scale. Hospital routine was followed in control group, and the post test was done on the 10th day by using BWAT scale.

Data obtained was analyzed by using descriptive and inferential statistics and the effectiveness was assessed and tabulated.

MAJOR FINDINGS OF THE STUDY

Distribution of demographic characteristics of patients with diabetes mellitus in experimental group and control group

- ❖ Distribution of patients with diabetes mellitus according to their age group depicts in experimental group the majority 12(40%) of patients belonged to the age group of above 41-50years, and least 3 (10%) were in the age group of 30-40 years. In control group majority 15 (50%) of patients belonged to the age group of above 51-60years, and least 2 (7%) were in the age group of 30-40 years.
- ❖ Percentage wise distribution of patients with diabetes mellitus in experimental group according to their sex reveals the majority 20(67%) were male, and least 10 (33%) were female. In control group highest percentage 20(67%) were male, and least 10 (33%) were female.
- ❖ With regard to education in experimental group, majority of the patients with diabetes mellitus 20(67%) had primary education, and least 3(10%) had higher secondary school education. In control group majority of patients 12 (40%) had high school education, and least 1 (3%) had higher secondary education.
- ❖ With regard to occupation in experimental group majority of patients with diabetes mellitus 15 (50%) were coolie workers, and least 5 (16%) were self employee. In control group most of the patients 17(57%) were coolie workers, and least 5 (16%) were self employee.
- ❖ With regard to marital status in experimental group most of the patients with diabetes mellitus 27(90%) were married, and least 1(3%) were single. In control group most of the patients 27(90%) were married, and least 1(3%) were single.

- ❖ With regard to family monthly income in experimental group majority of patients with diabetes mellitus 24(80%) were between Rs 500– Rs 1000 and least 6 (20%) were between Rs 1001 – Rs 2000. In control group patients with diabetes mellitus all 30 (100%) were between Rs 500– Rs 1000.
- ❖ With regard to area of residence in experimental group majority of patients with diabetes mellitus 25 (83%) were from urban area and 5(17%) were from rural area. In control group majority patients with diabetes mellitus 26(87%) were from urban area and 4(13%) were from rural area.
- ❖ With regard to Duration of illness majority of the patients with diabetes mellitus 21(70%) were more than 4years, and least 9(30%) were between the year of 2-3 years. In control group majority of the patients with diabetes mellitus 19(63%) were 0-1 years, and least 5(17%) were more than 4years.
- ❖ With regard to Duration of treatment majority of the patients with diabetes mellitus 21(70%) were more than 4years, and least 9(30%) were between the year of 2-3 years and none of them between 0-1years. In control group majority of the patients with diabetes mellitus 19(63%) were 0-1 years, and least 5(17%) were more than 4years.
- ❖ The mean post test level of severity of wound score in the experimental 24.87(SD \pm 2.46) was significantly lower than the mean pre test level of severity of wound score 36.67(SD \pm 2.48). The paired ‘t’ value was (35.32) which is significant at (P< 0.05) level of significance, showed that there is significant difference between pre and post test level of severity of wound among patients with diabetes mellitus.
- ❖ The mean post test level of severity of wound score in the experimental group was 24.87 (SD \pm 2.46) was significantly lower than the mean post level of severity of wound score in control group 33.42 (SD \pm 2.28). The independent “t” value is 42.75 (table value 1.96) at (P< 0.05) level of significance showed that there is a significant difference between

Manuka honey application on severity of wound among patients with diabetes mellitus in experimental group

- ❖ There was no association found between post test level of severity of wound score among patients with diabetes mellitus with the demographic variables except for age ($\chi^2=8$), and education ($\chi^2=14.04$).

CONCLUSION

The present study was conducted to evaluate the effectiveness of honey on severity of wound among patients with diabetes mellitus. The mean post test level of severity of wound score of experimental group was 24.87 (SD \pm 2.46) and the control group mean score was 33.42 (SD \pm 2.28). The “t” value is 42.75 is greater than the table value (1.96) which is significant at (P< 0.05) level. The result of the study concluded that honey application was effective in reducing severity of wound among patients with diabetes mellitus.

NURSING IMPLICATIONS

NURSING SERVICE

- The nurses can practice honey application and dressing on reducing severity of wound among patients with diabetes mellitus as a evidence based practice.
- Nurse as the change agent can update knowledge to the nurse on alternative therapies to promote wound healing among diabetes mellitus patients

NURSING EDUCATION

- The nurse educator can provide include alternative therapies in teaching to update the knowledge among students on reducing severity of wound among patients with diabetes mellitus.
- Nursing students can conduct mini projects on honey application on severity of wound among patients with diabetes mellitus.

NURSING ADMINISTRATION

- The nurse administrator should conduct in-service education to nursing personnel regularly regarding other measures used in wound healing.
- Pamphlets, leaflet about Manuka honey properties and action can be made available to nursing staff in the surgical and medical wards and to nurse educators in nursing educational institution.

NURSING RESEARCH

- The findings can be utilized for further research to improve the knowledge in nursing.
- This study result will stimulate the new researcher to implement the similar intervention on non diabetic wounds.

RECOMMENDATIONS

- A comparative study can also be done between the effectiveness of various non – pharmacological measures on reducing the severity of wound.
- A similar study can be conducted on larger samples there by findings can be generalized to a large population.
- A similar study can be conducted in home care setting.
- A comparative study can be conducted with Manuka honey and natural honey on reducing severity of wound among patients with diabetes mellitus.

LIMITATION

- Since the understanding level of patients was different, patients took more than 15 minutes to accept the intervention.

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